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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

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PHASE II INVESTIGATION

153715

Target Rock Corporation
Town of Babylon

Site No. 152119 Suffolk County

DATE: May 1993

Report



Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, **A**lbany, New York 12233 Thomas C. Jorling, Commissioner

Division of Hozardous Waste Remediation Michael J. O'Toole, Jr., P.E., Director

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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE II INVESTIGATIONS

Target Rock Corporation
Town of Babylon, Suffolk County
NYSDEC I.D. No. 152119

Report

Prepared for:

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CHAPTER 1

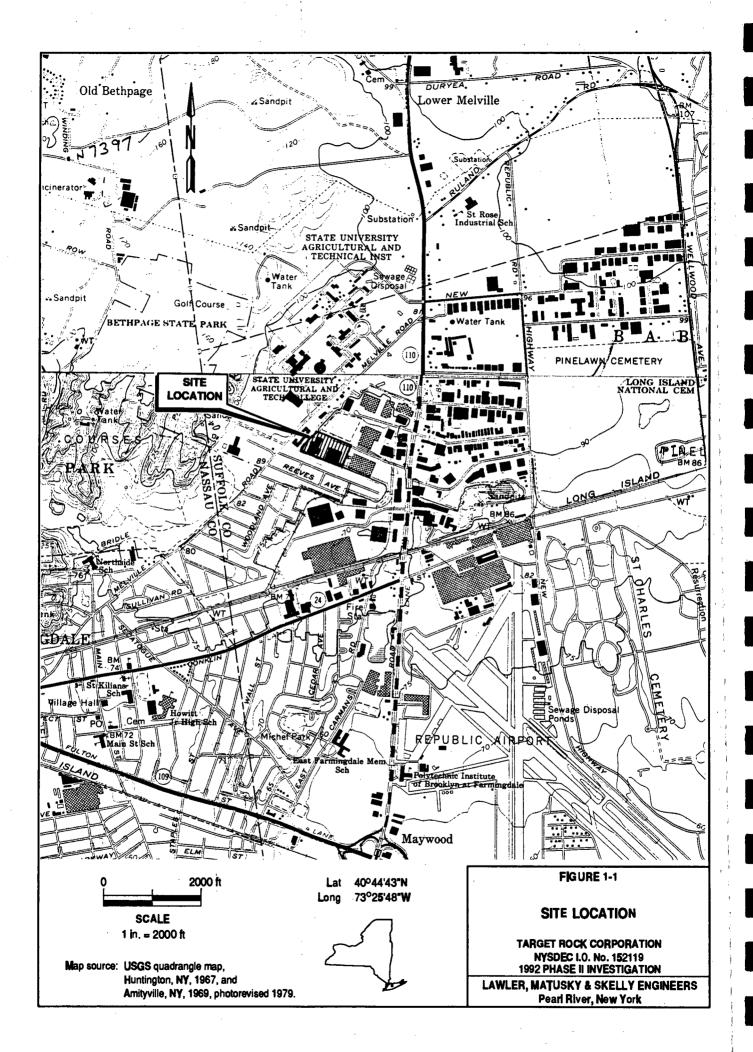
EXECUTIVE SUMMARY

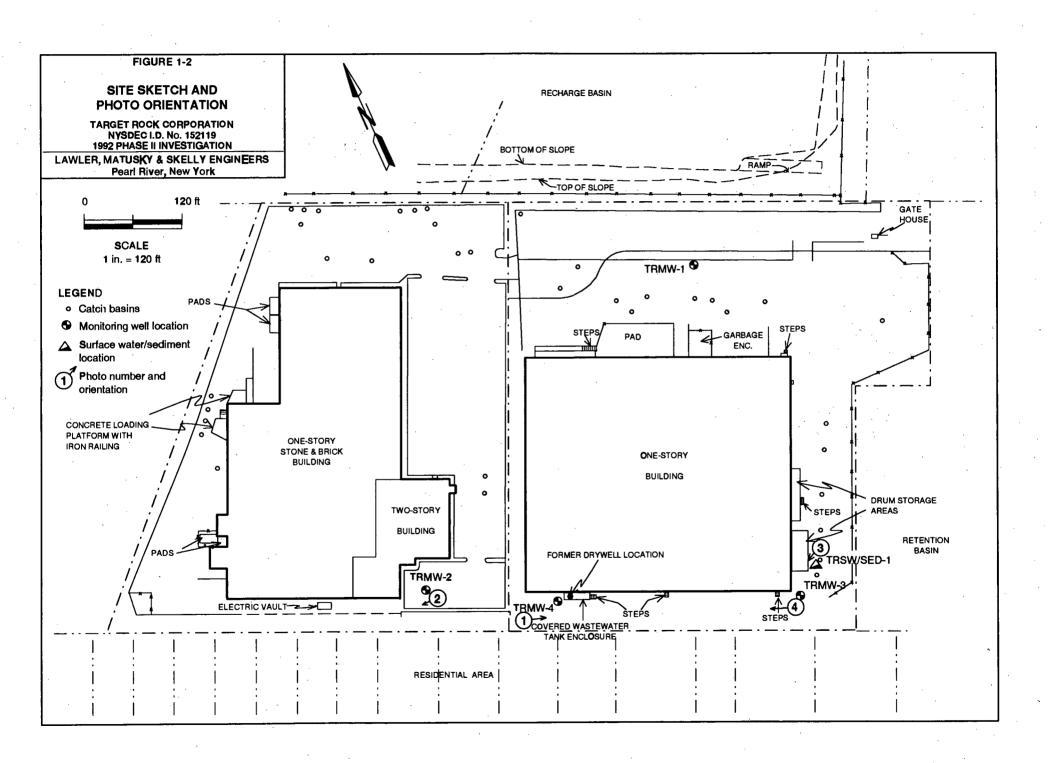
The Target Rock Corporation site is located off Broadhoilow Road in the Town of Babylon, Suffolk County, New York (Figure 1-1). The 11-acre site is occupied by two manufacturing buildings, each on 5-acre lots, and a 1-acre right-of-way (Figure 1-2). The company, a wholly owned subsidiary of Curtiss-Wright Corporation of Lyndhurst, New Jersey, is an active machine shop (see Photos 1-4, which are oriented to Figure 1-2). The site lies on relatively flat land on the western edge of a large industrial area. Residential areas are located to the west and south of the site.

Target Rock Corporation manufactures valves used primarily for nuclear power applications. Manufacturing processes include machining and testing of valves. Target Rock began manufacturing at the site in 1982 and operations continue today. From mid-1982 to September 1983 wastewater from the valve testing operation was discharged to a dry well located toward the rear of the east manufacturing building. Wastewater from this operation contained up to 5% 1,1,1-trichloroethane, classifying it as an industrial rather than a hazardous waste discharge. In addition, during routine inspections by the Suffolk County Department of Health Services (SCDHS), it was discovered that a number of leaking and improperly stored drums were present at the site. Discharges to the dry well were halted and drum storage practices improved by October 1983. The dry well was removed and replaced by stainless steel collection tanks that are pumped out periodically by a waste hauler.

Based on the SCDHS findings, a Phase I investigation was conducted at the site by Roux Associates, Inc., a subcontractor to Gibbs and Hill, Inc., in order to provide a preliminary characterization of hazardous substances discharged at the site. The investigation confirmed that wastewater containing solvent had been discharged at the site and recommended that a Phase II investigation be conducted.

Lawler, Matusky & Skelly Engineers (LMS), under contract to the New York State Department of Environmental Conservation (NYSDEC), was retained to perform the Phase





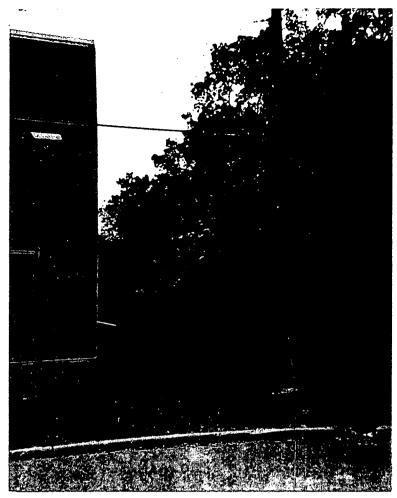


PHOTO 1.

Rear of east manufacturing building looking west.

Note covered wastewater tank enclosure against building.



PHOTO 2. Parking area east of west manufacturing building. TRMW-2 was installed in pavement near right-center of photo.

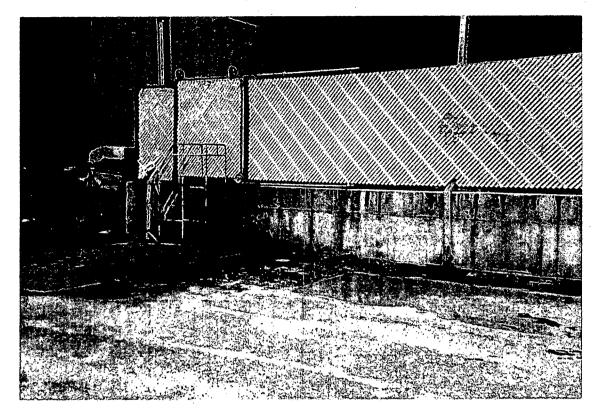


PHOTO 3. Drum storage area at southeast corner of east manufacturing building; note catch basin (SW/SED-1).



PHOTO 4. Rear of east manufacturing building looking west. Vent on side of building is for 10,000-gal underground fuel tank.

II investigation. The objective was to collect pertinent information to classify the site. The investigation included installation and sampling of four groundwater monitoring wells at the site. In addition, water and sediment samples were taken from a catch basin near the drum storage area.

The analytical results of the monitoring well and catch basin sampling indicate that trichloroethane is found in two of the wells and in the water in the catch basin at concentrations that exceed NYSDEC groundwater standards. 1,1,1-Trichloroethane was present at 66 µg/l in TRMW-4 and at 43 µg/l in TRMW-2; the water in the catch basin had a concentration of 20 µg/l. TRMW-3 and -4 and the sampled catch basin contained a number of tentatively identified semivolatile compounds that exceeded the NYSDEC Class GA groundwater standards. According to the LMS study, and assuming pure advective transport of contamination, the wastewaters discharged to the dry well have moved 755 ft from the source.

Based on the documented release of industrial waste at the Target Rock site, the following additional actions are recommended:

- 1. Periodic sampling of the monitoring wells should be conducted. If contaminant levels remain the same or increase, additional investigations should be conducted to determine the source of the contaminants.
- 2. An area well inventory should be conducted to determine whether any public or private wells are downgradient of the site.
- 3. Several additional wells should be installed downgradient of the site to check contaminant levels in the groundwater.
- 4. Although motor fuels and heating oils are not listed hazardous wastes, the permits and records of the former and existing tanks should be reviewed to ensure the tanks are in compliance.

CHAPTER 3

DESCRIPTION OF PHASE II INVESTIGATION

3.1 LITERATURE REVIEW

LMS conducted a search of Federal (Ref. 1), state (Ref. 2), and Suffolk County (Ref. 3) files pertaining to the Target Rock site. A Phase I report prepared by Roux Associates (Ref. 4) and copies of inspection reports and correspondence from the Suffolk County Department of Health Services (SCDHS) were located in NYSDEC's central office in Albany. Several NYSDEC inspection reports and correspondence as well as copies of a number of the SCDHS files were located in NYSDEC's regional office in Stony Brook. A Freedom of Information request to the U.S. Environmental Protection Agency (EPA) Region II offices revealed a Notification of Hazardous Waste Activity. No other related information (inspection reports or documents) was found in the EPA offices. Representatives of EPA's National Pollutant Discharge Elimination System (NPDES), air quality, and Pesticides and Toxic Substances programs were also contacted. The SCDHS office supplied site inspection forms and correspondence documenting activities at the site as well as several rounds of testing results. The SCDHS files also contained an interim permit to operate underground storage tanks. The permit, dated 6 July 1984, listed six underground storage tanks at the site in 1984. Tanks 3, 4, and 6 appear to be associated with vehicle refueling areas and were probably used to store gasoline or diesel fuel. The literature review updated and verified the information found in the Phase I investigation; details of the site history obtained during the literature review are found in Section 4.1.

3.2 SITE RECONNAISSANCE

A site reconnaissance (Ref. 5) was conducted by LMS personnel at the Target Rock site on 4 June 1992 before drilling and other field work began. The following tasks were performed.

 A site walk-over and inspection were conducted. Ambient air conditions were monitored to determine the appropriate level of respiratory protection to be used during field activities.

- Existing site conditions were observed with reference to the information found in the work plan.
- Relevant features at the site were photographed along with the proposed monitoring well locations. These photos were given to the driller so he could provide the appropriate equipment.
- Above- and underground utilities were located with the Target Rock plant engineer and a utility markout service was contacted to mark the buried utilities.
- Target Rock security and evacuation procedures were reviewed with the plant engineer and arrangements were made to secure areas for storage and decontamination during the fieldwork.
- Tentative monitoring well locations were staked out or marked.

Results of the site reconnaissance are discussed in Section 4.5.1.

3.3 GEOPHYSICS SURVEY

No geophysics survey was conducted at the site in accordance with work plan specification. Each monitoring well location was screened with a magnetometer before drilling activities were initiated.

3.4 SOIL GAS SURVEY

No soil gas survey was conducted at this site.

3.5 GROUNDWATER INVESTIGATION

3.5.1 General Monitoring Well/Boring Details

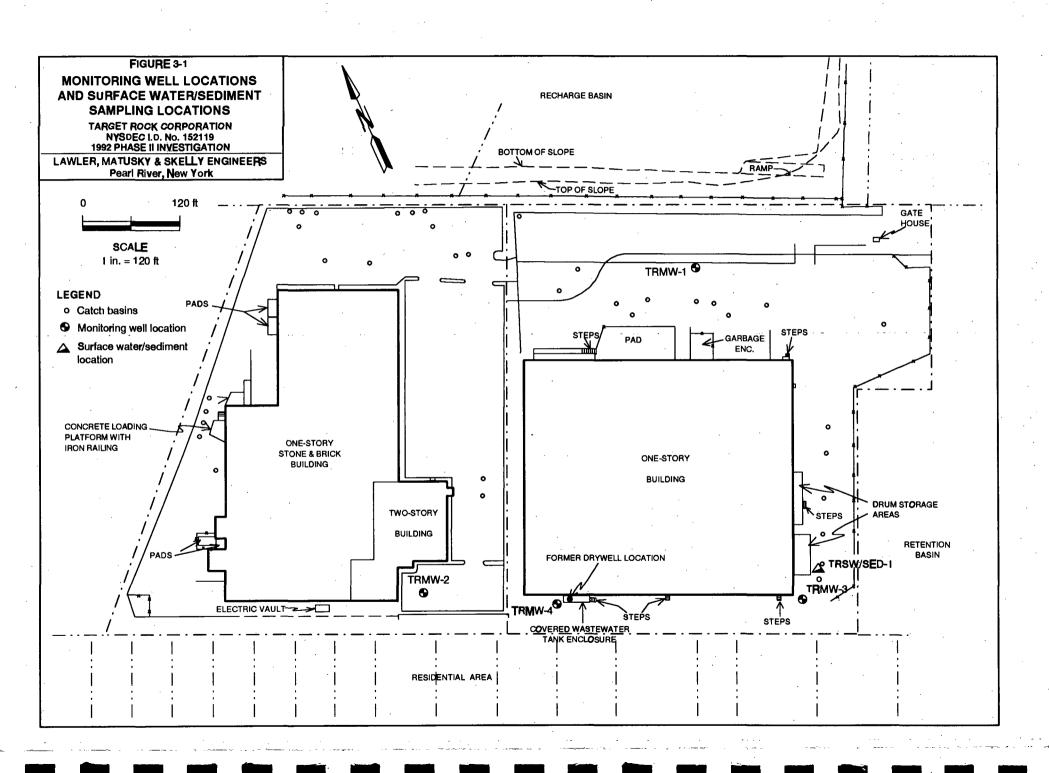
Four monitoring wells were installed at the site during the investigation from 13 to 17 July 1992 (Ref. 6). The monitoring wells were screened at or near the bottom of the upper glacial aquifer. Drilling, well construction, and logging were supervised by an LMS geologist. The drilling subcontractor, Water Resources, Inc., of Bayshore, New York, provided a truck-

mounted drill rig and drilling crew. The borings for the monitoring wells were advanced through unconsolidated glacial sediments using 3.75-in. inside diameter (I.D.) hollow-stem augers. Samples of the glacial sediments were taken at 5-ft intervals until the desired monitoring well depth was reached. A 210-lb downhole hammer with a 24-in. drop was used to drive the 1.375-in. I.D. split-spoon sampler. Soil identification was based on guidelines included in Exhibit 3 of LMS' contract with NYSDEC. Each split-spoon sample was scanned for organic vapors using a photoionization detector (PID) and a flame ionization detector (FID).

Once the boring was completed to the desired depth, a monitoring well was constructed within the boring. All monitoring well construction details followed Exhibit 3 guidelines. The following sections present the general monitoring well/boring details for each of the four wells completed at the Target Rock site.

3.5.1.1 TRMW-1. This upgradient well was installed in the parking lot 150 ft north of the loading docks of the east building on 13-14 July 1992 (Figure 3-1). The material encountered in the boring for this monitoring well included sands and gravels typical of the upper glacial aquifer; the water table was located approximately 10 ft below the ground surface. At approximately 31 ft a gray-black, laminated, very fine sand and silt was found at what is believed to be the top of the Magothy Aquifer. The hydraulic conductivity of this material was several orders of magnitude less than the upper glacial aquifer. As this investigation was intended to monitor compounds heavier than water (trichloroethane) that were released to a dry well, the well screen was set at the bottom of the upper glacial aquifer. This was done so that all the wells would be screened consistently near the bottom of the upper glacial aquifer.

After two split spoons (30-32 ft, 35-37 ft) showed similar deposits of the Magothy Aquifer, 2 ft of bentonite pellets were added to seal the Magothy from the upper glacial aquifer and the augers were retracted to 30 ft. At 30 ft 10 ft of 10-slot 2-in. Schedule 40 PVC well screen was set along with 20 ft of 2-in. Schedule 40 PVC riser. The sand pack, bentonite, and grout were then installed according to NYSDEC guidelines. As the well was located in a parking lot, it was fitted with a watertight, flush-mounted protective case and an inner lockable



waterproof cap. No FID/PID readings above background were noted during the drilling of TRMW-1.

3.5.1.2 TRMW-2. This downgradient well was installed approximately 30 ft east of the southernmost corner of the west building (Figure 3-1). Drilling and well construction took place on 16 and 17 July 1992. The boring for this well encountered 30 ft of sands and gravels of the upper glacial aquifer. The water table was found at approximately 10 ft below ground surface. Following the sands and gravels fine-grained laminated sands were encountered. It is not known whether these sands, which were different in appearance from the laminated sands found in TRMW-1, are part of the Magothy Aquifer; they do, however, represent a different depositional environment from that of the upper 30 ft of material and they have a lower hydraulic conductivity. A single FID reading of 40 was noted in the 10-12 ft spoon. No obvious soil staining was noted, and the PID readings were background. Use of the methane filter on the FID indicates the presence of methane, probably from the former sanitary leach field in the area. This well was screened with 10 ft of 10-slot Schedule 40 PVC along with 20 ft of Schedule 40 PVC riser. The sand pack, bentonite, and grout were installed according to NYSDEC guidelines. As this well was located in a parking area, it was fitted with a watertight, flush-mounted protective case and an inner lockable waterproof cap.

3.5.1.3 TRMW-3. This well was drilled and installed downgradient of the former drum storage area near the southern corner of the east building on 14 July 1992 (Figure 3-1). Approximately 30 ft of upper glacial sands and gravels were found; the water table was found at approximately 9 ft below ground surface. Below 30 ft a tan, very fine sand was found. Drilling was continued to 50 ft in a effort to find deposits typical of the Magothy Aquifer. At 50 ft the same laminated, tan, fine sand was found. This boring was grouted to the surface and a well was installed in a new boring to 30 ft with NYSDEC approval. The laminated sands were believed to have a much lower hydraulic conductivity than the upper 30 ft of material. At 30 ft 10 ft of 2-in. Schedule 40 10-slot screen was installed along with 20 ft of 2-in. Schedule 40 PVC riser. No PID readings above background were noted. FID readings were noted below 35 ft, but it is believed these readings were the result of methane. The readings were significantly lower when the methane filter was used. To maintain access to

the rear of the building, this well was fitted with a watertight, flush-mounted, protective case and an inner lockable waterproof cap.

3.5.1.4 TRMW-4. This well was installed just west of the former location of the dry well that received the wastewater from the valve testing operation (Figure 3-1). The location was selected because of limited access to this area. Directly downgradient of the dry well location the land rises to form a steep bank; between this bank and the containment structure a high-pressure fire main is buried. This boring encountered approximately 10 ft of sand and gravel fill followed by 20 ft of upper glacial sand and gravel. Below this, 7-8 ft (30-37 ft below ground surface) of a well-sorted medium to coarse sand was found. The water table was approximately 11 ft below the ground surface. From 35 to 47 ft a laminated coarse sand and silt was found. The well screen, consisting of 10 ft of 10-slot 2-in. Schedule 40 PVC, was set at 45 ft along with 35 ft of 2-in. Schedule 40 PVC riser. A sand pack, bentonite, and grout were then installed according to NYSDEC guidelines. The well was fitted with a watertight, flush-mounted, protective case and an inner lockable waterproof cap. A flush-mounted protective case was used to maintain access to the rear of the building.

3.5.2 Hydraulic Conductivity

After the four on-site monitoring wells were installed, developed, and sampled, the wells were slug-tested to determine the average horizontal hydraulic conductivity within each screened section (Ref. 7). Hydraulic conductivities were determined using equations derived from Bouwer and Rice for partially penetrating unconfined wells (Ref. 8).

The slug tests were conducted by quickly raising or lowering the static water level in the well using a clean, weighted, stainless steel slug of known volume. Head response with time was monitored using a pressure-sensitive transducer linked to a recording device. Each test was carried out until the water level in the well returned to static conditions.

The head data with time were then input into a computer program and the data were examined graphically. The best-fit, straight-line portion of the data was selected and used to solve for hydraulic conductivity (K) using the Bouwer and Rice method. The following table

presents the hydraulic conductivity values for wells TRMW-1 to -4 along with the arithmetic and geometric means of their hydraulic conductivities.

WELL	m/day	ft/day
TDAW 1	20.0	CO 5
TRMW-1	20.9	68.5
TRMW-2	11.3	37.2
TRMW-3	14.7	48.2
TRMW-4	18.7	60.2
Arithmetic mean	16.3	53.5
Geometric mean	15.9	52.1

3.6 OTHER PHASE II WORK TASKS

No other work tasks were performed during this Phase II investigation.

3.7 SAMPLING

3.7.1 Soil Sampling

A single soil sample was taken from the boring for TRMW-4. This soil sample was retrieved from the water table with a 1.38-in. LD. split spoon in the vicinity of the former dry well that had received wastewater from the valve testing operation. This sample was taken to determine whether any residual soil contamination existed in the former dry well location. This sample was submitted to Aquatec, Inc., of Colchester, Vermont, via chain-of-custody protocols for analysis for target compound list (TCL) volatile organics, TCL semivolatile organics, pesticides/PCBs, target analyte list (TAL) metals, and extraction procedure (EP) toxicity metals.

3.7.2 Groundwater Sampling

The four on-site monitoring wells were developed on 17 and 20 July 1992. All wells were developed to 50 nephelometric turbidity units (NTU) or less within the allotted 4-hr development time. TRMW-1 was developed on 20 July; the groundwater temperature stabilized at around 14°C with a pH of 6.3 and an NTU value of approximately 50. TRMW-2 was developed on 20 July to NTU values of 10 or less. The pH stabilized at approximately 6 with a groundwater temperature of 17.5°C. TRMW-3 was developed on 17 and 20 July. This well was developed until NTU values less than 50 were achieved; hard surging produced NTU values greater than 100. Groundwater temperature stabilized at around 18°C and pH measured 6.2. TRMW-4 was developed on 17 July; this well was developed until NTU values of 28 were achieved with a stabilized pH of 5.8 and a temperature of 15.4°C.

Groundwater samples were retrieved from the developed monitoring wells on 26 and 27 August 1992. Samples were split with Galli Engineering, which represented the site owner. Prior to sampling, each well was purged using dedicated polyethylene tubing fitted with a foot valve and centrifugal pump. The wells were purged a minimum of three times the volume of the well, assuming the well was 5 in. in diameter. If necessary, the wells were purged more than three times the volume to achieve turbidity values consistently below 50 NTU.

During well purging groundwater chemistries were taken (pH, specific conductivity, temperature, and turbidity). All of the wells were high yielding, recovering almost immediately after purging. A dedicated Teflon bailer was used to retrieve a groundwater sample from mid-depth of the screen. Before the bottles needed for metals analysis were filled, a sample chemistry was taken to check that the turbidity was lower than 100 NTU. If the turbidity was above 100 NTU, a separate filtered sample was taken for dissolved metals. All samples were placed in containers supplied by the analytical laboratory; the filled containers were labeled and packed on ice in a sealed, insulated cooler. Each day the samples taken were listed on a chain-of-custody form and sent in the sealed coolers to an overnight courier for delivery to the laboratory the next morning. Analyses performed on each monitoring well sample included TCL volatile organics, pesticides/PCBs, and semivolatiles; TAL metals and filtered metals (if necessary) and cyahide; chemical oxygen

demand (COD); and total dissolved solids/total suspended solids (TDS/TSS). The TAL metals and filtered metals samples were preserved with nitric acid; cyanide, with sodium hydroxide; and COD with sulfuric acid. Any preservatives used in the field were noted on the appropriate chain-of-custody form.

TRMW-1, sampled on 27 August 1992, was purged at 4 gpm until 240 gal was pumped from the well. The purge water was initially silty, with NTU values over 200. After the well was purged for some time, values of less than 10 NTU were achieved, but gentle surging caused a rise to around 100. Turbidity of the groundwater, checked just before the metals sample container was filled, was over 100 NTU, necessitating that a filtered metals sample also be taken. After purging, the well recovered quickly and groundwater samples were retrieved from mid-depth of the screen. The field blank was taken at this well before samples were retrieved.

TRMW-2, sampled on 26 August 1992, was purged at 3 gpm until 180 gal was pumped from the well. This well had low turbidity (2 NTU) at the end of purging. After purging, this well recovered quickly and groundwater samples were retrieved from mid-depth of the screen. TRMW-3, sampled on 27 August 1992, was purged at 5 gpm until over 200 gal was pumped from the well. This well also had low turbidity (2 NTU) at the end of purging. After purging, the well recovered quickly and groundwater samples were retrieved from mid-depth of the screen. The required blind duplicate was taken from this well and submitted to the lab as TRMW-5.

Sampling began at TRMW-4 on 26 August 1992. The well was purged at 4.5 gpm until 247 gal was pumped. The water was initially silty, but quickly cleaned up to NTU values of approximately 1.0. After purging, the well recovered quickly and samples were retrieved from mid-depth of the screen. A matrix spike/matrix spike duplicate (MS/MSD) was also taken on this well.

3.7.3 Surface Water/Sediment Sampling

A surface water and sediment sample retrieved from the catch basin adjacent to the former drum storage area was split with Galli Engineering, which represented the site owner. Water sampling began on 26 August 1992. After the necessary bottles for volatile organic compound (VOC) and base/neutral acid extractable (BNA) analyses were filled, a heavy thunderstorm began. Because the catch basins are attached to the roof drainage, they quickly filled almost to the rim and the flow rate through them was high. As the thunderstorm diluted and flushed the water in the catch basin, the water samples already obtained were submitted to the laboratory with instructions to complete as many of the analyses as possible. This was done because the water sample taken before the thunderstorm was believed to be more representative of actual conditions in the catch basin.

The sediment sample from the catch basin was retrieved on 27 August 1992 using a laboratory-cleaned stainless steel ladle clamped to a wooden handle. The catch basin was 9.7 to 10 ft deep with a hard sand and gravel bottom. The retrieved sediment was noticeably oil stained and had an oil/sewer odor. An MS/MSD sample of the sediment was also collected.

3.8 AIR MONITORING

During the site reconnaissance air monitoring was conducted at seven locations across the site to determine background levels and identify possibly contaminated areas. Air monitoring was conducted using a PID and an MSA combustible gas indicator (CGI). The FID (OVA) was found to be inoperable during the site reconnaissance. Background values for the FID were determined just before drilling began. Based on the air monitoring data collected during the site reconnaissance (Ref. 5), a final site-specific health and safety plan (HASP) (Ref. 9) was prepared. It was determined that level D personal protective equipment would be adequate to protect a worker's health and safety. As a contingency, if background readings exceeded the action level, level C protective equipment was available for upgrade at all times.

CHAPTER 4

SITE ASSESSMENT

4.1 SITE HISTORY

Target Rock Corporation began manufacturing and testing valves at the site in early 1982, after the east building was purchased by Curtiss-Wright Corporation in mid-1981. Target Rock manufactures valves used primarily for nuclear applications.

The site was originally used as a sand and gravel bank. In 1972 the east building was built; it housed a J.C. Penney warehouse until Target Rock moved into the building in 1981. The exact date of construction of the west building is unknown. It was leased as office space by Target Rock, then purchased and expanded by 40,000 ft² in 1975.

Part of the valve manufacturing process involves nondestructive testing of the valves for minor cracks. This process involves cleaning the valves' metal surface by flood-washing them with water that contains up to 5% 1,1,1-trichoroethane. A dye with a high-penetrant oil base is then applied to the valves to reveal any cracks.

From mid-1982 until September 1983 the wastewater generated by the valve testing operation was discharged directly to a dry well located at the rear of the east building. The wastewater generated was reportedly less than 2000 gal per month. The reported concentration (5%) of 1,1,1-trichloroethane in the wastewater would classify this as an industrial waste discharge. To be classified as a hazardous waste discharge, the concentration would have to be 10% or greater (Ref. 10). The discharge to the dry well was discovered by the Suffolk County Department of Health Services (SCDHS) in early 1982 (Ref. 11). SCDHS also found a number of improperly stored and leaking drums along the eastern side of the east building. The drums contained a number of compounds, including oils, Freon, acetone, kerosene, 1,1,1-trichloroethane, tetrachloroethylene, and unknowns. These discoveries prompted several rounds of testing of both the dry well and the catch basins near the drum storage area.

Analysis of a sample collected on 5 May 1982 from a storm drain adjacent to a PVC pump-out pipe revealed the presence of 1,1,1-trichloroethane at 65 ppb and Freon 113 at 43 ppb (Ref. 12). The exact location of this sample cannot be ascertained, but it is believed to have been taken from a catch basin near the drum storage area. SCDHS advised Target Rock that these concentrations violated New York State Environmental Conservation Law. Additional samples were collected on 2 July 1982. Samples from the dry well contained 9 ppb of 1,1,1-trichoroethane, 6 ppb of tetrachloroethylene, and 62 ppb of Freon 113 (Ref. 13). An additional sample taken during this round from a "sanitary pool" (septic tank) on the southwestern side of the building (exact location unknown) contained 2 ppb of tetrachloroethylene. Another sample, taken from a location reported as "a pool on the west side of the building 10 ft south of enclosed drum storage area," contained 33 ppb of 1,1,1-trichloroethane, 6 ppb of 1,1,2-trichloroethylene, and 3 ppb of tetrachloroethylene.

The dry well was sampled again on 27 July 1983; 11 organic compounds were found, including 1,1,1-trichloroethane (43,000 ppb) and tetrachloroethylene (2300 ppb). Again SCDHS advised Target Rock that this violated New York State Environmental Conservation Law and that there should be no further discharges to the dry well.

In September 1983 a temporary collection tank for the wastewaters was installed. The dry well was pumped and cleaned out before being removed, and all stained soils were removed and carted away for disposal. In 1984 the area around the former dry well was excavated again to allow for construction of a waterproof, covered, concrete containment structure that was used to house two 2000-gal stainless steel tanks for the wastewater. As required, a waste hauler (Bay Shore Environmental) pumps out the tanks and hauls the waste to Pennsylvania.

During 1982 and 1983 the drum storage area was upgraded and drum storage practices were improved. An approved, watertight, covered containment area was built and surrounded by a chain-link fence. Information on the site does not indicate that any catch basins were sealed or cleaned out in the drum storage area.

At least six underground storage tanks were present on the site in 1984. A single permit and tightness test dated 6 July 1984 was found for tank 5 (rear of east building), a 10,000-gal

diesel tank currently used for No. 2 fuel oil. The plan that accompanies the permit indicates that five other tanks exist on-site but does not identify their contents. Tanks 1 and 2 appear to be fuel oil tanks for the west building; tanks 3, 4, and 6 appear to be associated with vehicle refueling areas, although neither the tanks nor their associated pumps were found during the site inspection. When the tanks were removed or whether they were leaking could not be ascertained.

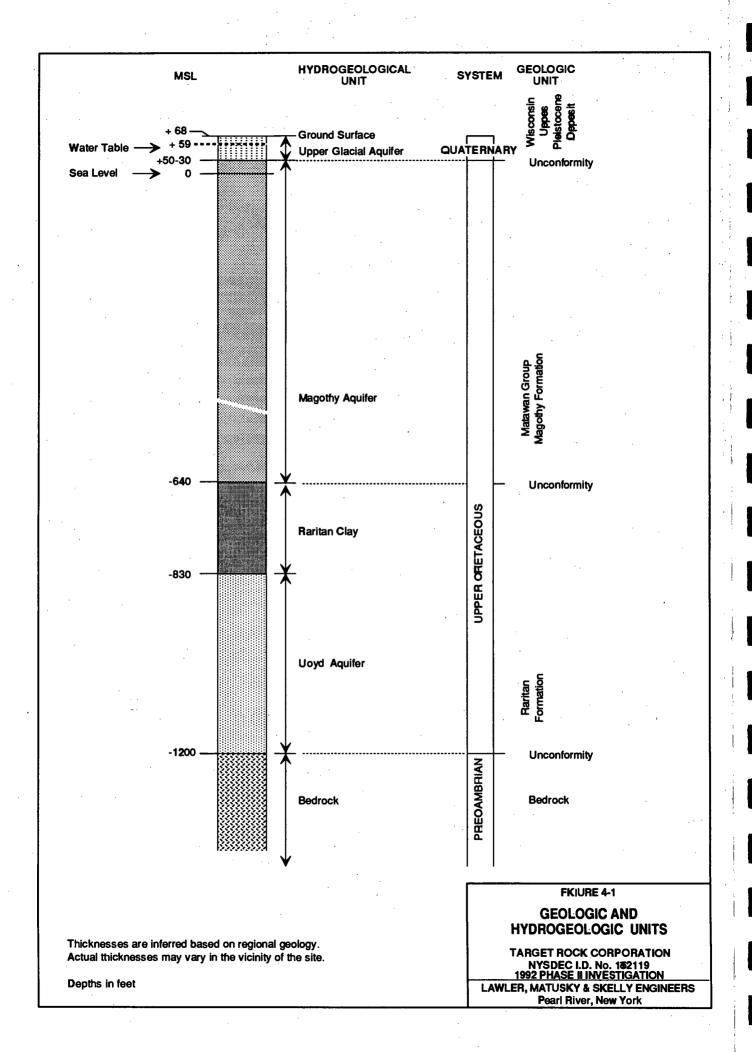
4.2 SITE TOPOGRAPHY

The Target Rock Corporation site is located on 11 acres in the Town of Babylon, Suffolk Counfy, New York. The site is approximately 0.5 mile east of Bethpage State Park, just off a short right-of-way from Broadhoilow Road (Route 110). Site elevations range from 73 to approximately 67 ft above mean sea level (msl). The site is relatively flat, sloping downward to the east and southeast. The area appears to have once been a gravel pit; the ground rises sharply upward to the south and west and then levels off into a residential area. To the north the land drops off quickly into a Suffolk County recharge basin. The closest major surface water is Massapequa Creek, about 2.5 miles to the southwest. Depending on the season and rainfall, the recharge basin north of the site occasionally contains standing water.

4.3 GEOLOGY

Long Island is underlain by consolidated bedrock that dips south-southeast. The bedrock is mantled by a thick sequence of unconsolidated deposits representing recurring intervals of deposition and erosion (Figure 4-1). Each particular sequence reflects a paleoenvironment that controlled the type and rate of deposition and/or erosion (Ref. 14). Of particular importance to this investigation is the uppermost sequence of deposits, which are of Pleistocene age. The older, Cretaceous deposits, although important aquifers, are dealt with here only briefly because of their great depth and confinement by protective layers with low hydraulic conductivity.

The Precambrian bedrock below the site is typically weathered crystalline metamorphic and igneous rocks, including mica schist, gneiss, and granite. The weathered zone of the bedrock



can be up to 100 ft locally. At the Target Rock site the bedrock is approximately 1200 ft below sea level. Unconsolidated deposits of Cretaceous age overlie the Precambrian bedrock and are grouped into the Raritan Formation, which includes the Lloyd sand and clay members, and the Magothy Formation. At the Target Rock site the Raritan Formation begins at about 640 ft below sea level and extends to about 1200 ft below sea level. The lower 370 ft of this formation is the Lloyd Aquifer. Following the deposition of the Raritan there was a period of nondeposition before the Magothy Formation was deposited. The Magothy Formation is of Cretaceous age and is composed chiefly of interbedded fine sands, silts, and clays, with discontinuous zones of sand and gravel. Most of the water-producing sands and gravels are found in the basal sections of the formation. This formation exhibits upward fining to the point that the upper sections of the formation are predominantly silts and fine sands. At the Target Rock site the Magothy Formation is found at approximately 50 ft above msl and extends to approximately -640 ft msl. After the deposition of the Magothy Formation there was a long period of erosion before the Magothy was buried by Pleistocene sands and gravels.

The Pleistocene Epoch on Long Island involved two major stades: the Ronkonkoma and the Harbor Hill; these can be characterized as periods of high deposition during which high-energy meltwater streams deposited massive amounts of sand and gravel in front of the terminus of the glacier. Many of the surface features seen today are the result of deposition during the Ronkonkoma stade, the farthest southern extent of glaciation, which is marked by the Ronkonkoma terminal moraine. The moraine deposits are chiefly till, a mix of clay, sand, gravel, and boulders. South of the Ronkonkoma terminal moraine, deposits consisting of quartzose sand and gravel were deposited in an outwash plain. At the Target Rock site these outwash sands and gravels range from fine gravel to medium sand that grades into a fine to medium sand with depth. The sand and gravel samples retrieved from the screened zone of the monitoring wells revealed a well to poorly sorted sand with uniformity coefficients ranging from 3.21 to 73.8 and effective grain sizes ranging from 0.004 mm to 0.36 mm (Ref. 14A).

Minor amounts of fill are also found at the Target Rock site. The area near the former dry well and the area around TRMW-2 have between 5 and 10 ft of fill. The fill near the former dry well appears to be clean sand and gravel and is recognizable as fill only because of traces

of concrete and/or brick. The area near TRMW-2 may have been used as a sanitary leach field in the past.

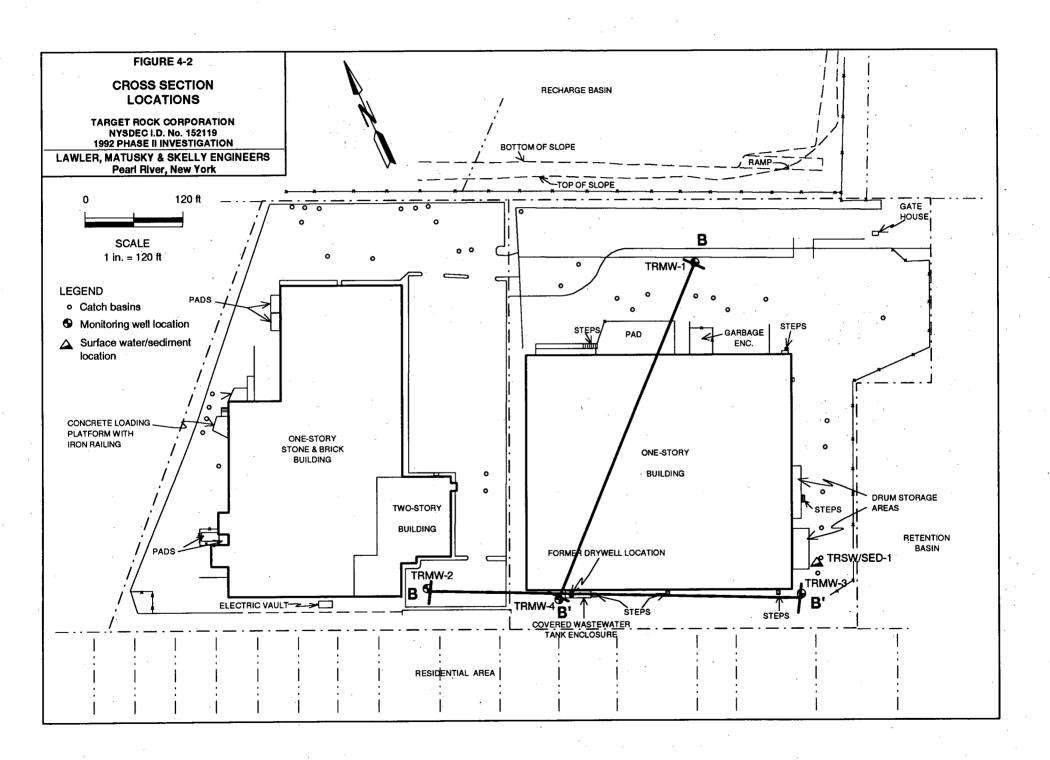
4.4 HYDROGEOLOGY

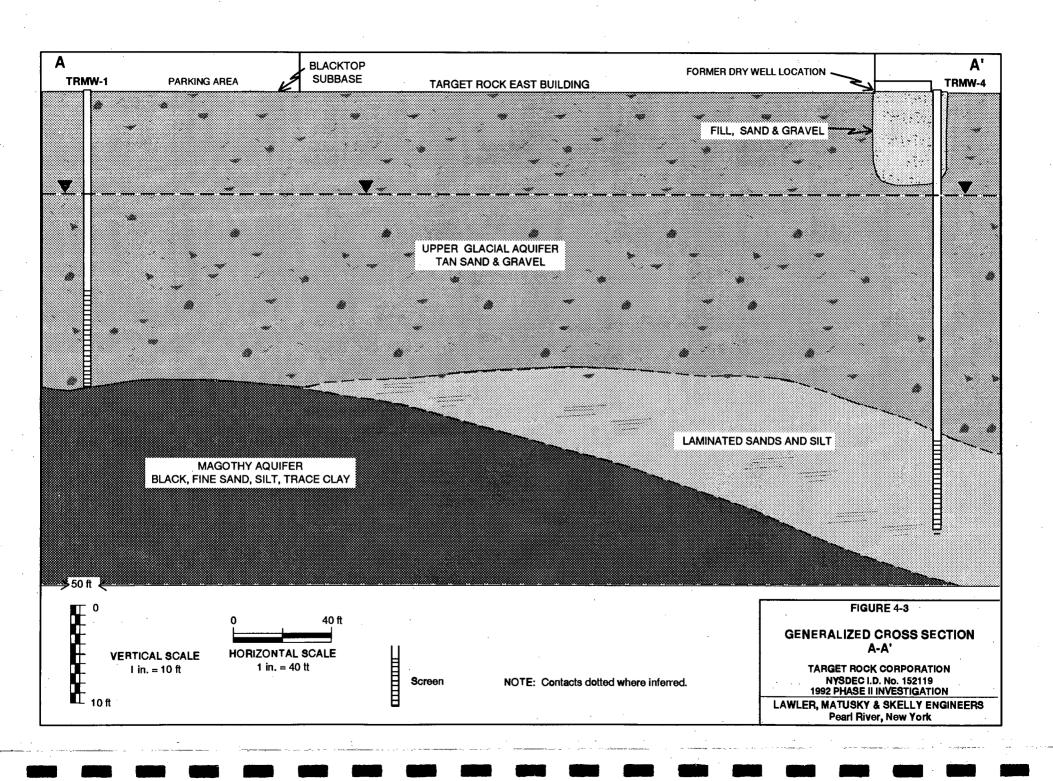
The hydrogeologic units at the Target Rock site correlate well with the stratigraphic units (Figure 4-1). Of primary interest to this investigation is the hydrogeology of the upper glacial aquifer and the degree of hydraulic connection of this aquifer with the Magothy. Due to the extremely long groundwater travel times to the lower units and the presence of the Raritan confining units, the hydrogeology of the lower units is not discussed here.

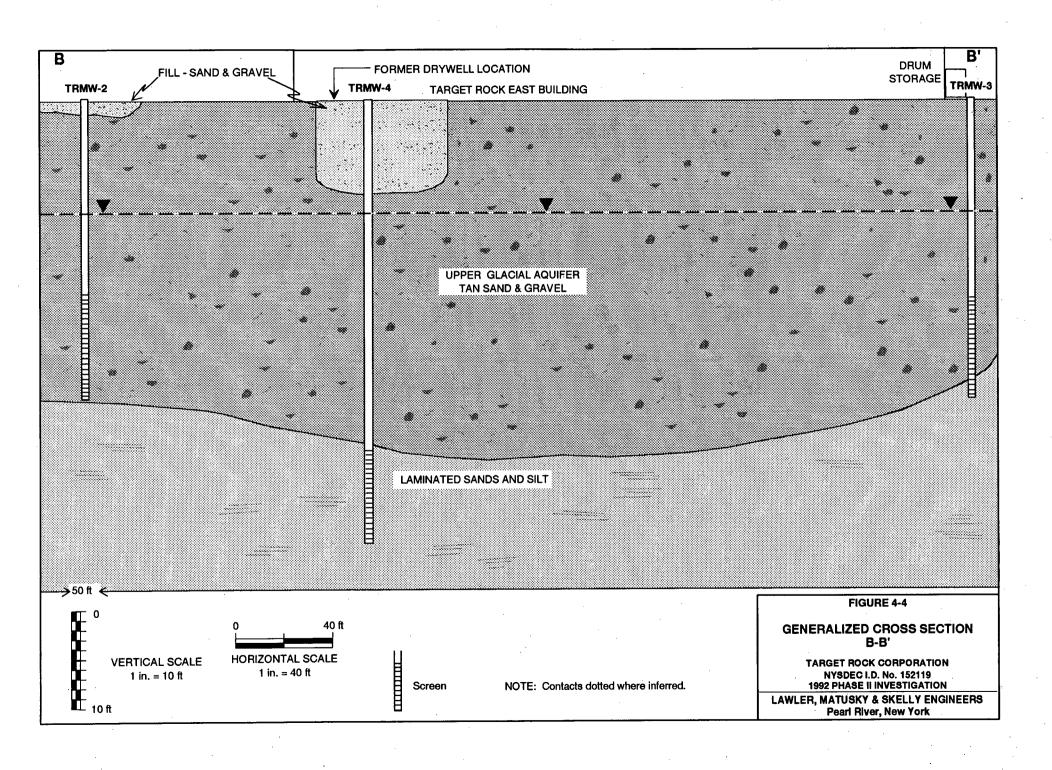
The Magothy Aquifer constitutes the principal aquifer for public water supply on Long Island (Ref. 15). The water in this aquifer is unconfined in the uppermost parts and confined in other areas. The Magothy is almost entirely recharged by downward leakage of water from the upper glacial aquifer. Recent modeling studies funded by SCDHS and the Nassau County Department of Public Works indicate that the Target Rock site lies within 2600 ft of the primary recharge area of the Magothy Aquifer (Ref. 16).

The average horizontal hydraulic conductivity of the Magothy is 50 ft/day; the vertical hydraulic conductivity is 0.5 ft/day. At the Target Rock site the Magothy and upper glacial aquifers are in direct contact. The much lower hydraulic conductivity of the upper Magothy would tend to slow downward movement of a contaminant. The Magothy was found at approximately 39 ft msl in TRMW-1 (Figures 4-2 and 4-3). Materials typical of the Magothy were not found in the other monitoring wells (TRMW-2, -3, or -4), indicating its top surface drops off to the south.

At the Target Rock site the Magothy Aquifer is mantled by the upper glacial aquifer. This aquifer is approximately 20 to 40 ft thick at the site and comprises Pleistocene outwash sands and gravels that tend to fine with depth. Generally, the upper 30 ft of material is a tan sand and gravel that grades into a laminated sand layer of variable thickness (Figures 4-3 and 4-4). The outwash sands and gravels are moderately to highly permeable, with an average horizontal hydraulic conductivity of 270 ft/day and vertical hydraulic conductivity of 27 ft/day



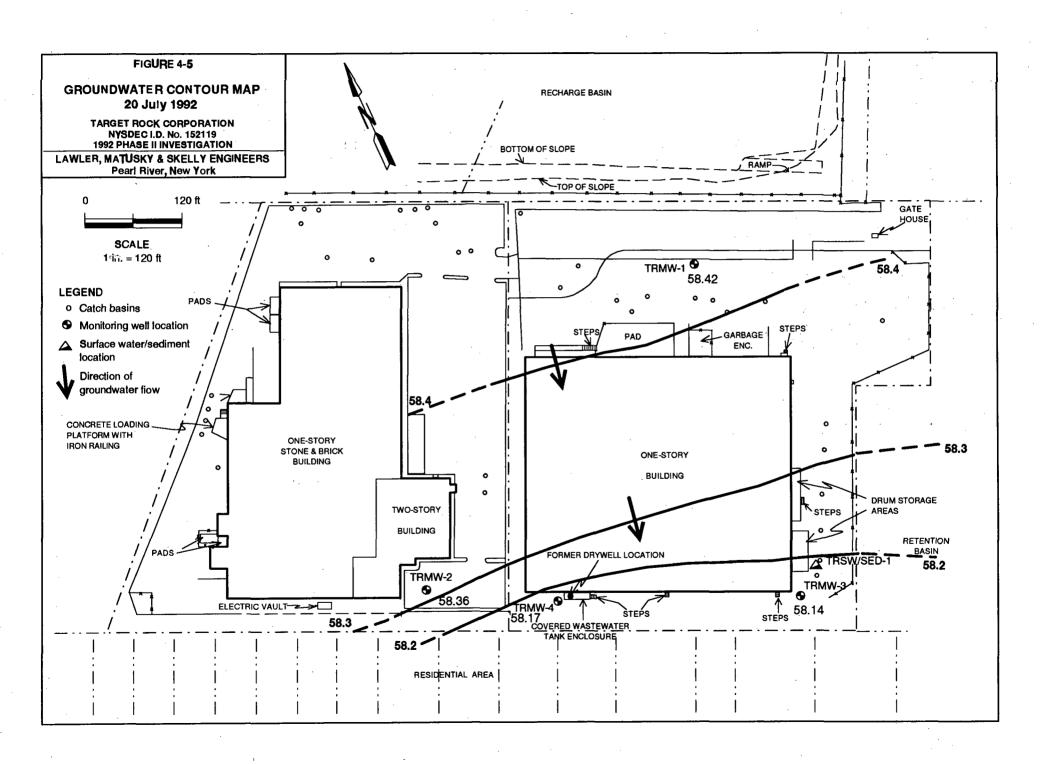


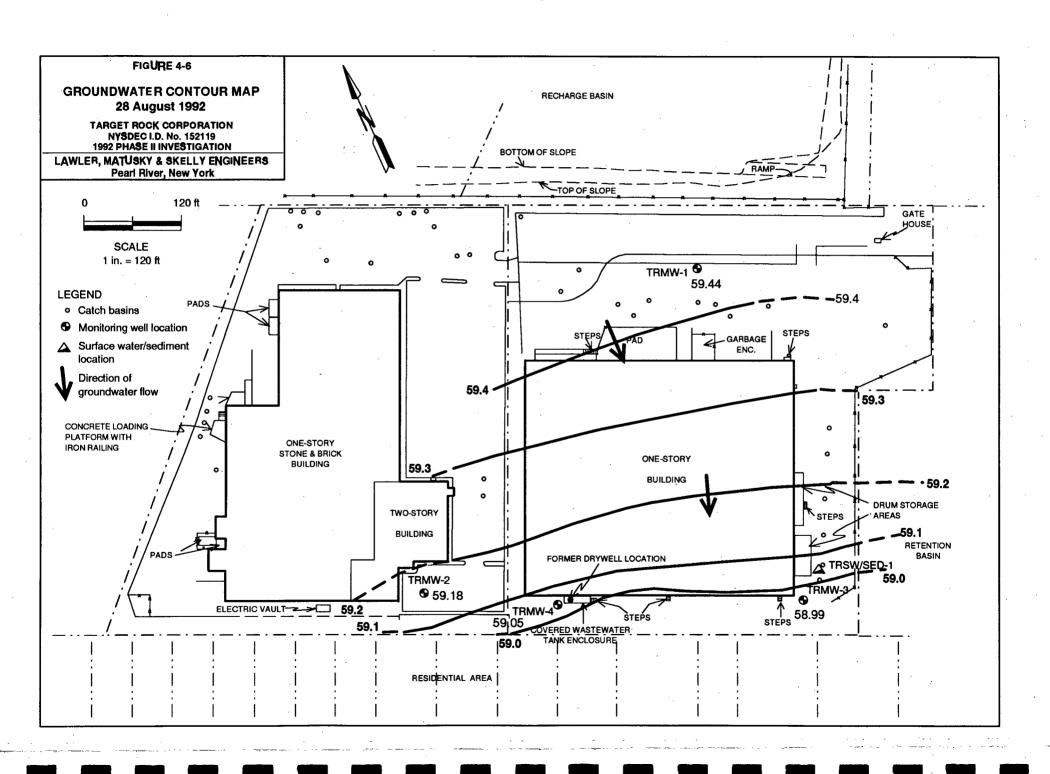


(Ref. 14). Slug testing conducted on the monitoring wells at the Target Rock site indicate an average horizontal hydraulic conductivity of 53 ft/day. This is considered a reasonable value even though it is five times less than the reported hydraulic conductivity of the upper glacial aquifer since the materials found at the site tend to be finer and not as well sorted as typical upper glacial aquifer sands and gravels.

Groundwater levels in the four monitoring wells were measured on 20 July (Figure 4-5) and 28 August 1992 (Figure 4-6). The water levels in the catch basins on the east side of the east building were also taken. These data were used to determine groundwater flow direction and velocity using a multilinear least-squares approach, which involves fitting known head data to the equation that describes the variation in head in a uniform flow field. The groundwater flow direction was determined to be 177° to the south-southeast with an average groundwater flow velocity of 0.23 ft/day. This flow is driven by a gradient of approximately 0.001 ft/ft, which has a negative (downward) component in the Z (vertical) direction. Assuming pure advective transport of the contaminant, the plume has moved 755 ft from the dry well since the discharge was stopped.

The Magothy and the upper glacial aquifers underlying the Target Rock site are heavily developed as sources of drinking water. South of the site (downgradient) most of the wells are completed in the Magothy. Two wells operated by the East Farmingdale Water District are near the site: one approximately 2000 ft north of the site, along Route 110, the other just north of the Long Island Rail Road, east of Route 110. These wells serviced a population of 7850 people in 1982 (Ref. 17). South of the site (downgradient), in North Amityville and Copiague, the Suffolk County Water Authority maintains four well fields (Ref. 17). These wells are approximately 2.5 miles from the site. Whether any residences in the site vicinity rely on private wells is unknown.





4.5 PHASE II RESULTS

4.5.1 Site Reconnaissance

LMS personnel conducted a site reconnaissance of the Target Rock site on 4 June 1992. Two Target Rock plant engineers provided a tour of the facility and its operations as well as a site history. The site is an active manufacturing facility that produces valves used primarily for nuclear power applications. The site employs between 200 and 300 workers; normal working hours are 8:00 a.m. to 4:30 p.m., Monday through Friday. The site is secured at all times by a perimeter fence and automatic gate.

There are currently two buildings on the site, the west building and the east building. The former is used for manufacturing and office space; the latter houses the shipping and receiving facilities, valve testing area, and additional manufacturing space.

The land not occupied by buildings is largely paved and used for parking. Numerous catch basins are located throughout the paved area; most appear to drain directly into the underlying soils. The remainder of the land consists of grassy medians, lawns, and low brush growth.

The valve testing operation was not in progress during the site investigation, but the valve testing area and wastewater holding tank were inspected. Wastewater generated during valve testing is allowed to drain (by gravity) into the tanks. One tank is on-line at a time. Level indicators in the building indicate when it is necessary to switch tanks or contact the waste hauler to pump out the tanks. One of the plant engineers reported that the rate of wastewater generation varied according to the particular step in the manufacturing process.

Two 2000-gal stainless steel wastewater tanks rest within a covered, waterproof containment structure that stands about 6 ft above the ground and extends approximately 10 ft below. The piping leaving the tanks exits the containment structure above ground and runs west along the building at the southeast corner of the building, where the pipes end and are capped. An area of oil-stained soils (less than 1 ft in diameter) observed at the end of the pipe is probably

the result of minor spillage during transfer from the tank to the waste hauler's truck. The containment structure is located on the site of a former dry well that received wastewater from the valve testing operation.

The area where leaking drums were formerly located is now an approved drum storage area surrounded by a chain-link fence and covered by a roof. The inside has been constructed to contain any spill. Numerous drums are stored there, all in good condition.

Other notable site features include a recharge basin just north of the site. The plant engineer reported that one of the industries north of the basin had spilled several hundred gallons of fuel oil into the basin during a transfer.

4.5.2 Geophysics Data

No geophysics survey was conducted at the site.

4.5.3 Soils Data

The single soil sample retrieved from TRMW-4 (12-14 ft) was analyzed for TCL VOCs, TCL semivolatile organic compounds (SVOCs), pesticides/PCBs, TAL metals, and EP toxicity metals. The chemical data for this sample are summarized in Table 4-1. All validated analytical data are summarized and documented (Refs. 17A and 17B).

4.5.3.1 Organic Compounds. Three VOCs were found below the quantitation limit; two of them, methylene chloride and acetone, were also found in the blanks and can be attributed to laboratory contamination. The low levels of chlorobenzene can be attributed to environmental contamination. Six tentatively identified VOCs were also found.

Seven SVOCs were found below the quantitation limit and in the associated blanks; these compounds can be attributed to laboratory contamination. No PCBs or pesticides were detected except for low levels of Aroclor 1242 at 0.018 mg/kg.

TABLE 4-1 (Page 1 of 2)

SOIL SAMPLE DATA SUMMARY (July 1992) Target Rock NYSDEC I.D. 152119

P AB AMETER	TRMW-4
VOLATILE ORGANICS (mg/kg)	
Methylene chloride	0.001 b j
Acetone	0.008 b j
Chlorobenzene	0.003 j
Tentatively Identified Compounds	
Unknown alkane	0.034 (2) j
Unknown hydrocarbon	0.124 (2) j
Unknown cyclohexane	0.025 j
Unknown dimethylcyclooctane	0.027 j
SEMIVOLATILE ORGANICS (mg/kg)	
bis(2-Ethylhexyl)phthalate	0.046 b j
Tentatively Identified Copmounds	
Unknown	0.209 (2) b j
2-Pentanone, 4-hydroxy-4-met	6.50 a b j
Benzaldehye	0.073 b j
Unknown bromocompound	0.250 b j
Unknown bromochlorocompound	0.210 b j
PESTICIDES/PCBs (mg/kg)	
Aroclor 1242	0.018 j
EP TOX METALS (mg/l)	
Arsenic, total	<1
Barium, total	<10
Cadmium, total	<0.1
Chromium, total	<1
Lead, total	<1
Mercury, total	<0.04
Selenium, total	<0.1
Silver, total	<1
CONVENTIONALS Percent solids, total (%w/w)	91.2

<sup>Number of compounds in total.
Suspected aldol condensation product.
Found in associated blanks.
Estimated concentration; compound present below quantitation limit.</sup>

TABLE 4-1 (Page 2 of 2)

SOIL SAMPLE DATA SUMMARY (July 1992) Target Rock NYSDEC I.D. 152119

PARAMETER	TRMW-4	EASTERN BACKGRØUND NATIVE SØIL CØNCENTRATIØNS (b)
TAL METAL 0 (()		
TAL METALS (mg/kg)	740	22.222
Aluminum	748	33,000
Antimony	3.8 B	SB
Arsenic	0.31 B	3.0 - 12.0 æ
Barium Bandiium	7.7 B	12 - 6,000
Beryllium Codmium	0.10 B	0 - 1.75
Cadmium Calaium	ND	0.1 - 1.0
Calcium	183 B	130 - 35,000 æ
Chromium	6.5	1.5 - 40.0 æ
Co b alt	ND	2.5 - 60.0 æ
Copper	2.3 B	1,0 - 60:0
Iron	3,230	2,000 - 560,000
Lead	0.61	4,0 - 61
Magnesium	208 B	100 - 5,000
Manganese	20.5	50 - 5,000
Mercury	ND	0:001 - 0:2
Nickel .	1.5 B	0.5 - 25
Potassium	ND	3,500 - 43,000
Selenium	ND	0.1 - 3.9
Silver	0.71 B	
Sodium	ND	6,000 - 8,000
Thallium	ND	*
Vanadium	2.4 B	1.0 - 300
Zinc	5.4	9.0 - 50
Cyanide	ND	

⁻ New York State background concentration.

⁻ Ref. 18.
- Value is less than contract-required detection limit but greater than instrument detection limit.

ND - Not detected at analytical detection limit.
SB - Site background.

4.5.3.2 *TAL Metals/EP Toxicity*. A number of metals were detected in the sample. When compared with typical concentrations found in native soils, the metals concentrations are all within natural ranges. Analysis of the EP toxicity metals indicated that all concentrations were below detection limits.

4.5.4 Groundwater Data

Groundwater samples collected from the four monitoring wells installed at the site were analyzed for TCL VOCs, SVOCs, and pesticides/PCBs; TAL metals and cyanide; COD; TSS; and TDS. The detected contaminants were evaluated against the NYSDEC Class GA groundwater standards. Table 4-2 summarizes the chemical data for the groundwater samples from the Target Rock site along with the NYSDEC Class GA standards. Natural ambient ranges for metals are included on the table. All validated analytical data are summarized and documented (Refs. 17A and 17B).

4.5.4.1 Volatile Organic Compounds. Of the four groundwater samples submitted for analysis, VOCs were detected at levels above the contract-required quantitation limit (CRQL) in two wells. The samples from TRMW-2 and -4 contained 43 and 66 µg/l of 1,1,1-trichloroethane, respectively. Both values are significantly above the NYSDEC GA standard of 5 pg/l. Several other chlorinated organic compounds were present below the quantitation limit in all the wells except TRMW-1. No tentatively identified compounds (TICs) were found in the groundwater samples. Methylene chloride and acetone were also found below the quantitation limit in all the samples, including associated field and trip blanks. It is believed the methylene chloride and acetone can be attributed to laboratory contamination and not actual contamination at the site.

4.5.4.2 Semivolatile Organic Compounds. bis(2-Ethylhexyl)phthalate was detected in all of the groundwater samples. This compound was found above the CRQL in TRMW-1 (18 pg/l), TRMW-3 (32 pg/l), and TRMW-4 (26 µg/l) and below the CRQL in TRMW-2 (3 µg/l). No other TCL SVOCs were detected above the CQRL in the four groundwater samples submitted for analysis.

TABLE 4-2 (Page 1 of 3)

GROUNDWATER SAMPLE DATA SUMMARY (AUGUST 1992)

Target Rock NYSDEC I.D. No. 152119

PARAMETER	TRMW-1	TRMW-2	TRMW-3	TRMW-4	MS TRMW-4	MSD TRMW-4	(Blind dup of TRIAW-3) TRMW-5	FIELD BLANK 8/27/92	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (pg/l)									
Methylene chloride	1 b j	1 b j	2 b j	2 b j	1 b j	2 b j	2 b j	. 1bj	5.0
Acetone	4 b j	4 b j	5 b j	11 b	8 b j	11 b	∦ bj	4bj	NS
Carbon disulfide	ND	ND	ND	15	14	- 14	ND	ND	NS
1,1-Dichloroethylene	ND	ND	ND	2 j	*	. •	ND	ND	9.0
1,1-Dichloroethane	ND	2 j	ND	1 j	1 j	.1 j	ND ·	ND	5.0
1,2-Dichloroethylene (total)	ND	NĎ	ND	4 j	4 j	4 j	ND	ND	5.G
Chloroform	ND	ND	ND	1 į	1 j	1 j	ND	ND 🖁	7.0
1,1,1-Trichloroethane	ND	43	4 j	6 6	6Ó	60	3 j	ND 8	5.0
Trichloroethylene	ND	ND	NĎ	8 j	*	*	NĎ	ND	5.0
Tetrachloroethylene	ND	ND	ND	3 j	2 j	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	NĎ	NĎ	3 j	ND	ND	5,0
Tentatively Identified									-
Compounds	ND	ND	ND	ND	ND	ND	ND	ND ND	
SEMIVOLATILE ORGANICS (pg/l)							•		
bis(2-Ethylhexyl)phthalate	18 b	3 j	32 b	26	41	23	26 b	NR	50

⁻ Spiking compound; data not representative of actual sample concentration.
- Found in associated blanks.

⁻ Estimated concentration; compound present below quantitation limit.

MS - Matrix spike.

ND - Not detected at analytical detection limit.

NR - Not run.

NS - No standard.

MSD - Matrix spike duplicate.

TABLE 4-2 (Page 2 of 3)

GROUNDWATER SAMPLE DATA SUMMARY (AUGUST 1992)

Target Rock NYSDEC I.D. No. 152119

PARAMETER	TRMW-1	TRMW-2	TRMW-3	TRMW-4	MS TRMW-4	MSD TRMW-4	(Blind dup of TRMW-5 TRMW-5	FIELD BLANK (8/27/92)	NYSDEC CLASS GA STANDARDS
SEMIVOLATILE COMPOUNDS (
Tentatively Identified Compoun	ds								
Hexadecane	19 j	4 j	37 j	45 j	NR	NR	27 j	ND	50 GV
Heptadecane	39 j	8 j	57 j	87 j	NR	NR	59 j	ND	50 GV
Pentadecane, 2,6,10,14-tetra	10 j	2 j	14 j	14 j	NR	NR	14 j	ND -	50 GV
Octadecane	37 j	8 j	56 j	92 j	NR	NR NR	56 j	ND	50 GV
Nonadecane.	33 j	7 j	50 j	83 j	· NR	NR	45 j	ND	50 GV
Eicosane	20 j	4 j	29 j	51 j	. NR	NR	27 j	ND	50 GV
Unknown aliphatic	ND	5 j	ND ·	ND	NR	NR	ND	3 b j	50 GV
Unknown	35 (5 <u>)</u> j	27 (3) j	51 (4) j	46 (2) j	NR	NR	48 (4) j	24 b.j	50 GV
Phenol, 4,4'-butylidenebis[2	22 j	4 j	36 j	59 j	NR	NR	34 j	ND	50 GV
Pentadecane	ND	ND	8 j	10 j	- NR	NR	ND	ND	50 GV
Unknown alkane	10 (2) j	ND	11 j	43 (4) j	NR	NR	8 j	.ND	SO GV
Cyclohexane, undecyl-	4 j	ND	7 j	11 j	NR	NR.	ND	ND	50 GV
Hexadecane, 2,6,10,14-tetram	10 j	ND	16 j	24 j	NR	NR	15 j	. ND	50 GV
Unknown aliphatic aldehyde	ND	ND	ND	17 j	NR	NR	8 j	ND ·	50 GV
Heneicosane	6 j	ND	· 9 j	17 j	NR	NR	9 j	ND	50 GV
Unknown aliphatic esters	32 (3) j	ND	93 (4) j	57(2) j	NR	NŔ	143 (5) j	ND	50 GV
Benzenesulfonamide, n-butyl-	ND	ND	ND	ND	ND	ND	ND	76 j	50 GV
PESTICIDES/PCBs (pg/l)	ND	ND	ND	ND	ND ·	ND	ND	ND	
CONVENTIONALS (mg/l)					, ·				
Total dissolved solids	160	120	40	95	NR	NR	130	ND	NS
Total suspended solids	110	64 .	5.3	4.9	NR	NR.	6.1	ND	NS
Chemical oxygen demand	27.4	<5	<5.0	10.0	NR	NR	<5.0	ND	NS

^{() -} Number of compounds in total.b - Found in associated blanks.

⁻ Estimated concentration; compound present below quantitation limit.

GV - Guidance value.

MS - Matrix spike.

ND - Not detected at analytical detection limit.

NR - Not run.

NS - No standard.

MSD - Matrix spike duplicate.

TABLE 4-2 (Page 3 of 3)

GROUNDWATER SAMPLE DATA SUMMARY (AUGUST 1992) Target Rock NYSDEC I,D, No. 152119

PARAMETER	TRMW-1	FILTERED TRMW-1	TRMW-2	TRMW-3	TRMW-4	DUP TRMW-4	(Blind dup of TRMW-3) TRMW-5	FIELD BLANK-1 (8/27/92)	NVSDEC CLASS GA STANDARDS	NATURAL GW AMBIENT RANGES (n)
TAL METALS (pg/	/I)				-					
- Aluminum	475	57.1 B	306	97.7 B	77.3 B	62.7	104 B	33.9 B	NS	<5.0 - 1,009
A ntimony	ND	26.8 B	ND	ND	36.6 B	ND ·	ND	ND	3.0 GV	-
Arsenic	ND	ND W	ND W	ND W	ND W	ND	ND W	ND	25	<1.0 - 30
Barium	49.6 B	41.8 B	27.5 B	ND	30.7 B	31.3 B	ND `	ND	1,006	10 - 500
Beryllium	ND	ND	ND -	ND	ND	ND	ND	- ND	3.0 GV	<10
Cadmium	ND ·	ND	ND	ND	ND ·	ND	ND	ND	10	<1.0
Calcium	23,200	22,300	12,400	18,400	7,660	7,740	18,500	ND	NS	1,000 - 150,000
Chromium	5.3 B	ND	1.6 B	ND	ND	ND	1.9 B	ND	50	<1.0 - 5.0
Cobalt	6.7 B	ND	ND	ND	ND	ND	. ND	ND	NS	<10
Copper	6.9 B	ND	4.1 B	9.2 B	2.9 B	3.1 B	11.2 B	ND	200	<1.0 - 30
Iron	443	69.1 B	329	130	68.0 B	77.0 B	141	45.7 B	300 (m)	10 + 10,000
Lead	3.3	1.6 B	3.0	2.7 B	1.3 B	1.2 B	2.5 B	ND	25	<15
Magnesium	4,640 B	4,540 B	3,550 B	4,730 B	2,770 B	2,820 B	4,740 B	ND	35,000 GV	1,000 - 50,000
Manganese	8,060	7,610	21.8	2,230	21.3	21.2	2220	ND	300 (m)	<1.0 - 1,000
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	2.0	<1.0
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	NS	<10 - 50
Potassium	5,720	6,120	3,480 B	3,830 B	2,890 B	2,660 B	5,370	ND	NS	1,000 - 10,000
S elenium	ND	ND	ND	ND	ND	ND	ND	ND	10	<1.0 - 10
Silver	3.7 B	3.9 B	2.5 B	ND	3.9 B	3.2 B	4.8 B	2.5 B	50	< 5.0
Sodium	17,800	17,400	25,900	22,300	26,300	26,400	22,000	ND	20,000	600 - 120,000
Thallium	ND	ŃD	ŃD	ŇD	ND	ŃD	ŇD	ND	4.0 GV	
Vanadium	4.2 B	ND	ND	ND	ND	· ND	ND	ND	NS	<1.0-10
Zinc	47.3	35.8	65.6	64.0	90.2	91.2	60.5	19.0 B	300	<10 +2,000
Cyanide	ND	NR	ND	ND	ND	ND	ND	- ND	100	

⁽m) - Iron and manganese not to exceed 500 pg/l.

⁻ Ref. 19.

⁻ Value is less than contract-required detection limit but greater than instrument detection limit.

^{₩ -} Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.

GV - Guidance Value.

ND - Not detected at analytical detection limit.

NR - Not run.

NS - No standard.

DUP - Duplicate sample analysis.

A number of tentatively identified SVOCs were found in all the wells, including the upgradient well (TRMW-1). Most of these TICs are long-chain hydrocarbons. None of the TICs were detected above NYSDEC Class GA standards in wells TRMW-1 or -2. Five classes of TICs exceeded the NYSDEC Class GA standards in TRMW-3: heptadecane at 57 pg/l, octadecane at 56 pg/l, nonadecane at 50 μ g/l, four unknowns with a total estimated concentration of 51 μ g/l, and four unknown aliphatic esters with a total estimated concentration of 93 pg/l. Six classes of TICs exceeded the NYSDEC Class GA standards in TRMW-4: heptadecane at 87 μ g/l, octadecane at 92 pg/l, nonadecane at 83 pg/l, eicosane at 51 pg/l, phenol, 4,4'-butyldenebis[2] at 59 μ g/l, and two unknown aliphatic esters with a total concentration of 57 pg/l.

4.5.4.3 *TAL Metals*. A number of metals were found above the Class GA standards or guidance values. Although manganese and iron plus manganese exceeded the standards in TRMW-1 and -3, it is believed to be a natural condition. Sodium exceeded the NYSDEC Class GA standard in TRMW-2, -3, and -4. As the sodium values were only slightly above the standard, and well within naturally occurring ranges, they are not of concern. The concentration of antimony exceeded the NYSDEC guidance value in the filtered TRMW-1 sample and in TRMW-4. These values may not represent actual groundwater concentrations as they are suspect due to "nondetects" in duplicate samples.

4.5.5 Surface Water/Sediment Data

A single surface water/sediment sample was collected from the catch basin just east of the drum storage area. Table 4-3 summarizes the chemical data for surface water and Table 4-4 summarizes the sediment data. Four VOCs were found in the catch basin water sample: methylene chloride (1 pg/l), acetone (5 pg/l), and 1,1-dichloroethylene (7 pg/l) were present below the quantitation limit, while 1,1,1-trichloroethane was found at 20 pg/l. The methylene chloride and acetone were also found in the associated blanks and can be attributed to laboratory contamination. The NYSDEC Class GA standards for 1,1-dichloroethylene and 1,1,1-trichloroethane are both 5 µg/l. The Class GA standards apply because the water in the catch basins is in direct contact with the groundwater. Eleven SVOCs were found in the sample; 10 were TICs. bis(2-Ethylhexyl)phthalate (1 pg/l) can be attributed to laboratory

TABLE 4-3

SURFACE WATER SAMPLE DATA SUMMARY (AUGUST 1992)

Target Rock NYSDEC I.D. No. 152119

PARAMETER	TRSW-1	TRIP BLANK 8/96/92	
VOLATILE ORGANICS (pg/l)			
Methylene chloride	1 b j	1 b j	S.0
Acetone	- 5bj	4 b j	NS
1,1-Dichloroethylene	7 j [*]	ND	5.0
1,1,1-Trichloroethane	20	ND	5.0
Tentatively Identified Compounds	ND	ND -	-
SEMIVOLATILE ORGANICS (pg/l)			
bis(2-Ethylhexyl)phthalate	1 j	NR	50
Tentatively Identified Compounds			
Unknown	22 (3) b j	NR	SO GV
Dodecanoic acid	3 b j	NR	SO GV
Tetradecanoic acid	2 b j	NR	SO GV
Hexadecanoic acid	4 b j	NR	SO GY
Unknown aliphatic	35 b j	NR	SO GV
Unknown aliphatic esters	133 (3) j	NR	SO GV
Benzenesulfonamide, n-butyl-	NR	NR	SO GV
PESTICIDES/PCBs (pg/l)	ND	NR	

⁻ Number of compounds in total.
- Found in associated blanks.

⁻ Estimated concentration; compound present below quantitation limit.

⁻ Guidance value.

Not detected at analytical detection limit.
 Not run.
 No standard.

ND NR NS

TABLE 4-4 (Page 1 of 3)

SEDIMENT SAMPLE DATA SUMMARY (AUGUST 1992)

Target Rock NYSDEC I.D. No. 152119

PARAMETER	TRSED-1	MS TRSED-1	MSD TRSED-1
VOLATILE ORGANICS (mg/kg)	-		<u>-</u>
Methylene chloride	0.002 b j	0.002 b j	0.003 b j
Acetone	0.006 b j	0.006 b j	0.007 b j
Tentatively Identified Compounds			
Unknown hydrocarbon	0.021(3) j	NR	NR
Unknown polycyclic hydrocarb	0.008 j	NR	NR
Unkown cyclohexanes	0.031(2) j	NR	NR
Unknown dimethyl-cyclooctane	0.01 8 j	NR	NR
OFMINOLATILE ODGANIGO (**** (I.)		•	
SEMIVOLATILE ORGANICS (mg/kg) Phenanthrene	0.000 :	0.040 :	0.045 :
Fluoranthene	0.029 j	0.046 j	0.045 j
	0.036 j	0.063 j	0.079 j
Pyrene bis(2-Ethylhexyl)phthalate	0.039 j 0.650	0.920	1,600
		0.020	
Tentatively identified Compounds			
Undecane	0.340 j	NR	NR
Dodecane	0.250 j	NR NR	NR
Tridecane	0,230 j	NR	NR
Tetradecane	0.280 j	NR	NR
Pentadecane	0.280 j	NR	NR
Hexadecane	0.310 j	NR	NR
Heptadecane	0.520 j	. NR	NR

<sup>Spiking compound; data not representative of actual sample concentration.
Number of compounds in total.
Found in associated blanks.
Estimated concentration; compound present below quantitation limit.
Matrix spike.</sup>

j MS

NR - Not run.

MSD - Matrix spike duplicate.

TABLE 4-4 (Page 2 of 3)

SEDIMENT SAMPLE DATA SUMMARY (AUGUST 1992)

Target Rock NYSDEC I.D. No. 152119

PARAMETER	TRSEO-1	MS TRSED-1	MSD TRSED-1
SE賴IVOLATILE ORGANICS (mg/kg)			
Tentatively Identified Compounds			
Pentadecane, 2,6,10,14-tetra	0.350 j	NR	NR
Octadecane	0.380 j	NR	NR
Hexadecane, 2,6,10,14-tetram	0.480 j	NR	NR
Nonadecane	0.370 j	NR	NR .
Unknown alkane	1.830 (5) j	NR	NR
Tetracosane	0.420 j	NR	NR -
Unknown polycyclic hydrocarb	1.6 9 0 (3) j	NR	NR .
PESTICIDES/PCBs (mg/kg)	•		
4,4'-DDT	0.0017 j	. •	*
alpha-Chlordane	0.0015 j p	0.0018 j p	0.0016 j p
gamma-Chlordane	0.0010 j	0.0012 j p	0.0011 j p

⁻ Spiking compound; data not representative of actual sample concentration.
- Number of compounds in total.

⁽⁾

⁻ Estimated concentration; compound present below quantitation limit.

⁻ Pesticide/Aroclor target analyte has >25% difference for the detected concentrations between the two GC columns.

MS - Matrix spike.

NR - Not run.
MSD - Matrix spike duplicate.

TABLE 4-4 (Page 3 of 3)

SEDIMENT SAMPLE DATA SUMMARY (AUGUST 1992) Target Rock NYSDEC I.D. No. 152119

DUP TRSED-1 PARAMETER TRSED-1 TAL METALS (mg/kg) **Aluminum** 670 646 **Antimony** ND ND **Arsenic** ND 0.43 B 4.9 B 0.49 B Barium ND Beryllium ND Cadmium ND ND 240 B 214 B Calcium 16.8 16.1 Chromium 15.2 13.5 Cobalt Copper 61.7 66.0 1,280 1,380 Iron Lead* 8.4 N 10.0 Magnesium 205 B 251 B 7.7 9.7 Manganese ND ND Mercury 55.0 61.1 Nickel 291 B 351 B Potassium Selenium ND ND ND 0.44 B Silver **Sodium** ND ND **Thallium** ND ND Vanadium 3.2 B 3.9 B Zinc 38.6 E 42.6 Cyanide ND ND

- Due to elevated matrix spike recovery (154.5%) and poor duplicate correlation, reported concentrations for this element should be interpreted as estimated.
- B Value is less than contract-required detection limit but greater than instrument detection limit.
- E Value estimated due to interference.
- N Spiked sample recovery not within control limits.
- ND Not detected at analytical detection limit.
- DUP Duplicate sample analysis.

contamination. The TICs include an unknown aliphatic (35 μ g/l), three unknown aliphatic esters (total estimated concentration 133 pg/l), three unknown semivolatiles (total estimated concentration 22 pg/l), and low levels of dodecanoic acid (3 μ g/l), tetradecanoic acid (2 μ g/l), and hexadecanoic acid (4 pg/l). Insufficient sample was collected to complete the TAL metals and conventionals analyses.

The sediment sample retrieved from the catch basin had an oily odor and was visibly stained with oil. A number of compounds associated with petroleum products were found in the sample. Volatile organics found in the sample included methylene chloride and acetone, which are attributed to laboratory contamination, and seven TICs. The TICs included three unknown hydrocarbons (total estimated concentration 0.021 mg/kg), two unknown cyclohexanes (total estimated concentration 0.031 mg/kg), an unknown polycyclic hydrocarbon (0.008 mg/kg), and an unknown dimethyl-cyclooctane (0.018 mg/kg). Four SVOCs were found below the quantitation limit, including phenanthrene (0.029 mg/kg), fluoranthene (0.036 mg/kg), pyrene (0.039 mg/kg), and bis(2-ethylhexyl)phthalate (0.650 mg/kg). Twenty semivolatile organic TICs were found in the sample, including short-chain, long-chain, and polycyclic hydrocarbons. The total estimated concentration of these TICs was 7.73 mg/kg. Trace amounts of DDT and chlordane were also present below the quantitation limit in the sediment sample.

The results of the data validation report were reviewed by LMS; all data were found usable with appropriate qualifications (Ref. 20).

4.6 CONCLUSIONS

4.6.1 Soil

The analyses conducted on the single soil sample from TRMW-4 (12-14 ft) did not contain any organic contaminants above the quantitation limit. The EP toxicity analysis conducted on this sample indicated no detectable concentration of leachable metals. It appears that the excavation to remove the dry well also removed any highly contaminated soils associated with

the dry well. Whether there is any residual soil contamination outside the excavation area is unknown.

4.6.2 Groundwater

Groundwater samples taken from the four monitoring wells installed at the site revealed contamination with 1,1,1-trichloroethane in TRMW-2 (43 µg/l) and TRMW-4 (66 µg/l). The NYSDEC Class GA groundwater standard for 1,1,1-trichloroethane is 5 pg/l. The suspected source of the 1,1,1-trichloroethane in TRMW-4 is the former dry well: 1,1,1-Trichloroethane was the solvent found in the valve testing wastewater. The extent of any chlorinated solvent plume originating at the former dry well location is unknown. Based on the high concentrations of 1,1,1-trichloroethane released to the dry well and the groundwater velocity and direction, it is likely that the bulk of the original contamination has moved off-site.

The suspected source of the 1,1,1-trichloroethane in TRMW-2 is unknown. This contamination may be the result of solvent-contaminated wastewater being disposed of in the sanitary leach field in this area or spillage of solvents on the ground. The former dry well that received valve testing wastewater is an unlikely source of the contamination owing to the similar concentrations seen and the positions of TRMW-4 and -2 relative to the groundwater flow direction. The extent of any contaminant plume in the vicinity of TRMW-2 is unknown, but based on the groundwater flow direction and velocity, the contamination has likely moved off-site.

Only trace amounts of 1,1,1-trichloroethane (4 μ g/l) were found in TRMW-3, along with a number of TICs at concentrations higher than at the upgradient well (TRMW-1). This would indicate that any spillage or leaks from the former drum storage area would have a minimal effect on on-site groundwater quality. Whether the former drum storage area was a source for contaminants that moved off-site after the drum storage area was upgraded is unknown.

The semivolatile TICs found in all the wells and the catch basin are probably the result of minor spills and parking lot runoff. The presence of these compounds at higher concentrations in TRMW-1 (upgradient well) than in TRMW-2 and at similar concentrations

in TRMW-1, -3 and -4 indicates the site may be impacted by an upgradient source. The area north of the site is industrialized and the Target Rock plant engineer reported what he believed to be a 200-gal fuel oil spill into the recharge basin north of the site. He believed the spill resulted from an overfill during transfer at one of the industrial sites north of Target Rock.

4.6.3 Surface Water/Sediments

The single surface water/sediment sample collected from the catch basin just east of the drum storage area contained 1,1,1-trichloroethane at 20 μ g/l, along with low levels (7 μ g/l) of 1,1,-dichloroethylene. It is believed that the catch basin from which the sample was retrieved is in direct contact with the groundwater and therefore NYSDEC Class GA standards apply. The Class GA standards for 1,1,1-trichloroethane and 1,1-dichloroethylene are both 5 μ g/l. The water sample was collected just before a heavy thunderstorm that quickly filled the catch basin with water. The collected sample is believed to represent conditions that ordinarily exist in the basin. The likely source of the contamination in the catch basin is the drum storage area or from disposal of wastewater containing low levels of contaminants. The areas around this catch basin did show evidence (i.e., staining) that minor amounts of wastewater are being disposed of to the catch basin.

A sediment sample was also retrieved from the catch basin bottom. The bottom appears to be mostly sand and gravel, with trace amounts of silt. The sediments had a distinct petroleum hydrocarbon odor and appeared lightly stained with oil. A number of TICs were found in the sample, primarily compounds associated with petroleum products.

4.7 RECOMMENDATIONS

Based on the documented release of wastewater containing chlorinated solvents and the detection of these solvents above NYSDEC groundwater standards in TRMW-2 and -4 and in the catch basin near the drum storage area, the following additional actions are recommended for the Target Rock site.

- 1. Periodic sampling of the monitoring wells to ensure that contaminant levels decline as any residual contaminants disperse into the aquifer. If contaminant levels remain the same or increase, additional investigations should be conducted to determine the source of the contaminants.
- 2. Inventory of area wells to determine whether any public or residential wells are downgradient of the site. If wells are found, they should be sampled to ensure that the site is not impacting the groundwater quality.
- 3. Installation of several additional wells downgradient of the site as the contaminants may have moved 700 or more feet off site.
- 4. File review to ensure that the tanks that were removed were not leaking and that the tanks currently on-site are in compliance with environmental regulations, even though motor fuels and heating oils are not listed hazardous wastes. (During the file review conducted for this Phase II investigation, documentation indicated that six underground storage tanks were on-site in 1984.)

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- [5] Lawler, Matusky & Skelly Engineers (LMS). 1992. Site inspection report.
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 - [19] Dragun, J. 1988. The Soil Chemistry of Hazardous Materials. Silver Spring, MD: Hazardous Materials Control Research Institute.
 - [20] Lawler, Matusky & Skelly Engineers (LMS). 1992. Data usability summary. [Appendix B]

LIST OF SUPPORTING DOCUMENTATION

REFERENCE DOCUMENTATION

U.S. Environmental Protection Agency (EPA), Region II. Records and files. [Ref. 1]

New York State Department of Environmental Conservation (NYSDEC). Records and files. [Ref. 2]

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II SUBCONTRACTOR OR SUBCONSULTANT REPORTS

- II.i Data Validation Report [Ref. 17A]
- ILii Analytical Data Package [Ref. 17B]
- II.iii Grain-Size Analysis [Ref. 14A]
- III HEALTH AND SAFETY PLAN [Ref. 9]
- IV SITE INSPECTION REPORT [Ref. 5]
- V SAMPLING REPORT
- VI PERMEABILITY TESTS AND CALCULATIONS [Ref. 7]

APPENDIX A

BORING LOGS AND WELL DIAGRAMS

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 1 of 1 TRMW-1 Borina/Well I.D. Project Name: Target Rock Corporation Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 68.79 Location Description: Right of way 100 ft. W of entrance LMS Project #: 576-054 Date Started/Completed: 7-13/14-92 Total Depth (ft): 35 Drilling Company: Water Resources Inc. Geologist: M. Lehtinen, V. Carbone Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 10.00 PID/FID (ppm) LITHOLOGY SAMPLE NUMBER SLOWS/.5ft RECOVERY DEPTH | GEOLOGIC DESCRIPTION WELL DIAGRAM **PROFILE** .2 Black top. 0/0 .6 Subbase. Tan fine, medium sand trace fine gravel 5 1.5 0/0 SS-1 Tan fine, medium sand some fine gravel (dry). 10 0/0 6 Tan very coarse sand and fine gravel, 0.0 SS-2 trace medium sand (wet). Water table at 7 t0.00 feet (Upper Glacial Aquifer-UGA). 6 • 6 15 0/0 6 1.4 SS-3 10 Same as above (wet). 13 (UGA) 20 1.2 0/0 Same as above (wet). SS-4 (UGA) Screen Sand 25 PVC 1.6 0/0 6 Q oc Tan very coarse sand some fine gravel SS-5 9 0.010 trace medium sand (wet). 14 20 (UGA) ٠,٥ 30 0/0 6 1.8 .4 Same as above (wet). SS-6 10 10 2.0 Gray-black, gray very fine sand and 17 black silt, trace clay, organics (moist sand and silt banded, plastic, brown silt in tip) Pyrite fragment (Magothy Aquifer). 35 SS-7 Same as above (moist). 15 20 Monitoring well was installed at 30 ft. (screened interval from 20-30 ft.). 40

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 1 of 2 Project Name: Target Rock Corporation Boring/Well I.D. TRMW-2 Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 70.20 Location Description: SW of parking lot behind two story building LMS Project #: 576-054 Date Started/Completed: 7-15-92 Total Depth (ft): 45 Drilling Company: Water Resources Inc. Geologist: M. Lehtinen, V. Carbone Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 11.56 PID/FID (ppm) DEPTH FT. **3LOWS/.5ft** RECOVERY SAMPLE VALUES GEOLOGIC DESCRIPTION **NELL DIAGRAM PROFILE** .2 Black top. 0/0 Dark Brown fine, medium sand little subrounded fine, medium gravel trace coarse gravel (damp). 5 NR SS-1 No recovery (Quartzite cobble in tip of spoon). 10 2 1.8 40 .4 Dark Brown fine, medium sand little fine SS-2 subrounded, rounded gravel. 4 3 .2 Brown coarse, medium sand little fine 4 gravel. .2 Brown medium and coarse sand some fine sand trace fine gravel (damp to wet). Water table at tt.56 ft. (Upper Glacial Aguifer - UGA). 15 2 0/0 Methane filter shows background on the 2 SS-3 OVA. 2 Brown medium and coarse sand little fine gravel (UGA) (wet). 20 5 0/0 .2 Same as above (UGA) (wet). Morie Screen SS-4 6 0.010 PVC 25 6 LO 0/0

	TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 2 of 2								
Pr	ojec	: Na	me:	Targ	get Rock (Corporation Boring/Well	I.D. T	RMW-2	
LMS	Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 70.20 LMS Project #: 576-054 Location Description: SW of parking lot behind two story building Date Started/Completed: 7-15-92 Drilling Company: Water Resources Inc. Surface Elevation (ft): 70.20 Location Description: SW of parking lot behind two story building Total Depth (ft): 45 Geologist: M. Lehtinen, V. Carbone								
						Geologist: M. Lehtinen, V. Carb	one		
Drilli	n g Meth	od:_4	.25 in	HSA/	5 ft SS Samplin	g Initial Water Level (ft): 11.58			
Τ.	~	Î.	≿	PII	D/FID (ppm)	The state of the s	<u>ا</u> ا		
ОЕРТН ЕТ.	SAMPLE	BLOWS/.5ft.	RECOVERY	VALUES	PROFILE	GEOLOGIC DESCRIPTION	LITHOLOGY	WELL DIAGRAM	
		12				Game as above (UGA) (wet).			
	SS-5	20 25					PVC Soreen		
							\$ 27	S Sar	
_							0.010	#2 Marie Sand	
-				ı			· • ¥		
30- -	SS-6	10 12 1 3	1.9	0/0		.5 Tan medium, coarse sand some fine sand little fine rounded gravel.			
		20		24		.5 Gray-black, silty clay some fine sandy clay.			
						.5 Orange fine sand and silt.		· ·	
-						.2 Lt. Green, white fine sand and silt.			
35-		27	1.9	0/0		.2 White fine sand and silt (UGA?).			
· -	SS-7					.5 White fine sand and silt.	0.00	· .	
_					•	.3 Brown fine sand some silt trace clay. 1.1 Brown medium, coarse sand some fine	8 0		
-						sand little rounded, subrounded fine gravel trace silt (wet) (UGA?).	• • •		
_			٠.			trace sitt (wet) (OOA7).	0 0		
40				2 (2		·	0 0		
40		6 2	1.2	0/0		White to gray fine sand and silt			
	SS-8	10 15	1			(wet) (UGA?).			
				•				·	
-								-	
-					*			-	
45-		6	1.0	0/0		.2 Light Orange fine sand and silt.			
-	SS-9	5			**	.2 Tan fine sand and silt.		4	
-		4				.2 White fine sand and silt.		-	
			٠			.4 Brown fine sand and silt (wet) (UGA?).			
				٠.		Monitoring well was installed at 30 ft. (screened interval from 20-30 ft.).		-	
50-									
				l			ĺ		

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 1 of 2 Project Name: Target Rock Corporation Boring/Well I.D. TRMW-3 Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 68.29 Location Description; Former drum storage area LMS Project #: 576-054 Date Started/Completed: 7-14-92 Total Depth (ft): 31 Drilling Company: Water Resources Inc. Geologist: M. Lehtinen, V. Carbone Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 9.56 PID/FID (ppm) DEPTH FT. **BLOWS/.5ft** LITHOLOGY RECOVERY SAMPLE GEOLOGIC DESCRIPTION WELL DIAGRAM **PROFILE** t.0 Construction and demolition debris. 0/0 Brown fine and medium sand (dry) (FILL). 5 0/0 5 .8 6 SS-1 Fine and medium sand trace silt, fine gravel 10 in tip of spoon (dry). 2.0" Sch.40 pvc 10 1.0 0/0 Medium and coarse sand some fine SS-2 graveltrace silt (wet). 5 6 Water table at 9.56 feet. (Upper Glacial Aquifer-UGA) 15 0/0 Same as above (wet, oxide stain on .3 SS-3 gravel). 5 (UGA). 20-39 .2 0/0 Same as above (wet). 0.010 PVC Screen SS-4 (UGA). 25 5 8. 0/0

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 2 of 2 Project Name: Target Rock Corporation Boring/Well I.D. TRMW-3 Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 68.29 Location Description: Former drum storage area LMS Project #: 576-054 Date Started/Completed: 7-14-92 Total Depth (ft): 31 Drilling Company: Water Resources Inc. Geologist: M. Lehtinen, V. Carbone Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 9.56 PID/FID (ppm) RECOVERY LITHOLOGY SAMPLE BLOWS/.5f GEOLOGIC DESCRIPTION WELL DIAGRAM **PROFILE** very coarse and coarse sand, little tine 9 gravel (wet, fining with depth, more coarse 19 SS-5 Soreen sand less gravel with depth). 20 Sand (UGA). 0.010 PVC 30 5 0/0 Tan fine and very fine sand, some silt 6 SS-6 (wet, no gravel). 10 (UGA). 35 25 1.6 0/15 Same as above (wet, OVA with filter 3.0). SS-7 (UGA). 40 1.8 0/20 Same as above trace very coarse sand 3 SS-8 (wet, OVA with filter 3-6). 6 16 (UGA). 45 2.0 .0/15 Tan fine and medium sand laminated oxide 14 SS-9 stain, trace very coarse sand, little silt 20 (wet, OVA with filter 2-3, coarser with 33 depth) (UGA). (UGA). 11 1.4 0/10 SS-10 Tan and orange fine and medium sand some 10 50silt (wet, OVA with filter 0). (UGA?). 14 23

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 1 of 2 TRMW-4 Project Name: Target Rock Corporation Boring/Well I.D. Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 70.58 Location Description: Former drum storage area. LMS Project 9: 576-054 Date Started/Completed: 7-15-92 Total Depth (ft): 31 Drilling Company: Water Resources Inc. Geologist: M. Lehtinen, V. Carbone Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 12.22 PID/FID (ppm) DEPTH FT. BLOWS/.5ft RECOVERY LITHOLOGY SAMPLE GEOLOGIC DESCRIPTION WELL DIAGRAM VALUES **PROFILE** Sand and gravel, little silt, trace concrete 0/0 (damp, FILL). 5 LO 2/0 2 SS-1 Same as above (FILL, damp). 4 10 0/0 1.3 Break between fill and natural material SS-2 5 2.0" Sch. 40 pvc Tan fine and medium sand trace fine 13 14 Water table at 12.22 feet (wet). (Upper Bentonite Pellets Glacial Aguifer - UGA). 15 0/0 6 .6 Fine and medium sand trace coarse sand 12 SS-3 trace medium subrounded gravel (wet). 12 20-0/0 1.1 Tan medium sand and fine sand some SS-4 coarse sand little fine graveL (UGA). 25 50 NR0/0

TEST BORING LOG/WELL CONSTRUCTION DIAGRAM Page 2 of 2 Project Name: Target Rock Corporation Boring/Well I.D. TRMW-4 Project Location: Babylon, Suffolk County, N.Y. Surface Elevation (ft): 70.58 Location Description: Former drum storage area. LMS Project #: 576-054 Date Started/Completed: 7-15-92 Total Depth (ft): 31 Geologist: M. Lehtinen, V. Carbone Drilling Company: Water Resources Inc. Drilling Method: 4.25 in HSA/5 ft SS Sampling Initial Water Level (ft): 12.22 PID/FIO (ppm) DEPTH FT. 3LOWS/.5ft RECOVERY **EAMPLE** NUMBER GEOLOGIC DESCRIPTION WELL DIAGRAM **PROFILE** No recovery. SS-5 Sch.40 pvc 30 1.6 0/0 .8 Tan medium sand and fine sand, some SS-6 20 coarse sand, trace fine gravel. 33 1.6 Tan fine and medium sand trace silt. trace mica (wet). (wet). 35 0/0 8 1.8 .9 White medium and coarse sand trace 8 SS-7 12 t.8 Laminated coarse sands of various widths, coarse white sands to red fine sand and silt between black organic silt trace mica (wet) (UGA). 40-PVC 15 2:0 0/0 Wash- .2 Same as above. 15 0.010 1 SS-8 20 t.8 Fine laminated sands more silt than above (UGA). 45 7 2.0 0/0 Laminated sands same as above (UGA). 5 SS-9 15 Monitoring well installed at 45 feet 35 (screened interval from 35 to 45 feet). 2.0 BG 7 5 15 35 50

APPENDIX B

DATA USABILITY SUMMARY

APPENDIX B

DATA USABILITY SUMMARY

Target Rock Corporation Site

The report from Data Validation Services concluded that sample analyses from the Target Rock Corporation site were compliant with the exceptions discussed below.

All samples were technically noncompliant as a result of the lack of internal chain-of-custody documentation. This does not affect the analytical results or data usability. The validator's report notes that sample handling and preparation sections of the data package are complete, and include all associated processing documentation.

Soil sample TRMW-4 (12-14 ft) was noncompliant for volatile organic compound analyses as a result of a continuing calibration standard (bromomethane). There was a 43% difference from the initial calibration recovery value; the allowable difference is 40%. Because no target compound list (TCL) compounds (including bromomethane) were detected in this sample, the fact that this single recovery value is just outside the required limit will not affect data usability. Volatiles data are usable without qualification.

The cyanide analyses performed on soil sample TRSED-1 were noncompliant due to a laboratory dilution error associated with analysis of a laboratory control sample. Since none of the Target Rock samples required dilution for cyanide analysis, data are unaffected and usable as reported.

Soil sample TRSED-1 as well as aqueous samples TRMW-2, -3, and -4 were noncompliant for cyanide because the laboratory holding time was exceeded by one day. There was no significant loss of cyanide and the data are usable without qualification.

Other issues noted in the validator's report that do not involve compliancy but do affect data usability are noted below:

The surrogate standard 2,4,6-tribromophenol recovered low in sediment sample TRSED-1, its matrix spike, and the matrix spike duplicate. The recovery values were 6, 8, and 14% respectively, with a lower recovery limit of 19%. Because this compound was the only surrogate outlier, and no acid components other than the spike compounds were detected in this sample or the matrix spike duplicate, acid results are usable with the qualification that detection limits for the acid spike compounds must be considered estimated. Base neutral results are usable without qualification.

Sediment sample TRSED-1 had an elevated lead matrix spike recovery of 154.5% (control limit 125%). The recovery would have been 110% if calculated against the duplicate value, indicating sample nonhomogeneity. As a result, the lead result for TRSED-1 is considered usable but qualified as estimated.

The data package developed by Aquatec for samples collected at the Target Rock site was of satisfactory quality. Aquatec followed good laboratory practice with reference to the analytical requirements for the samples submitted from the site. Whenever analytical problems were encountered, proper and timely corrective actions were implemented.

Overall, the results of LMS' usability review concluded that the data submitted for the Target Rock site are usable with the appropriate qualifications discussed in this usability report and Data Validation Services' final report.

APPENDIX C
PERTINENT FILES OR RECORDS

REFERENCE 11



PETER F. COHALAN SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

TARRES POUR GRO.
SUBSIDIAM OF CARTIC WRIGHT
1966-E BROADHOLLOW Rol
E. FARMINGDALE 11735

Nay 27,1982

Gentlemen:

An inspection of your plant was conducted by a representative of this Department on B ARCL $C \sim C$. This inspection revealed that

YOU COMMITTE SOLYCHT AND CUTTING OIL WATTE.

This waste is not to be discharged to the ground and may be transported and disposed only by an approved industrial waste scavenger. A listing of these scavengers may be obtained from Mr. Morris Bruckman at the New York State Department of Environmental Conservation in Stony Brook, telephone 751-7900.

In addition, Article 12 of the Suffolk County Sanitary Code gives specific guidelines for storage of toxic and hazardous materials. Please contact Mr. Alexander Santino, P.E., of this office at the number listed below for information and guidance in meeting these storage standards.

A reinspection of your facility has been scheduled to determine your compliance in this matter. If I can be of further assistance, please call me at 451-4635.

Very truly yours,

JAT C wohn H. Finkenberg Environmental Pollution Control JHF/cc

> 15 Horseblock Place Farmingville, NY 11738

SUFFOLK COUNTY DE UNIFORM COMPI	PT. OF HEALTH SERVICES anolisevised s'introduction LAINT FIELD REPORT
Hazardous Material & Industrial Waste	SPILL No. 1892-54 Telephone DOT No. Person X
Address	(SCDHS) Phone
Complaint AgainstTarget Rock Corp. Address1966E Broadhoilow Rd.	(T.V.H.) E. Farmingdal Phone
Mgr., admits there are leaks but clacutting oils.	storm drain - Mr. Fitzpatrick, Plant ims these leaks are of nontoxic to _J. FinkenbergDate_4/19/82
Persons Interviewed Addre	Phone
Information Obtained from Interviewed Individuals:	

មាមតែកូរ៉ាំ វិសាហមន

5,100



PETER F. COHALAN SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

Marcil 27, 1982

Target Rock Corp.
1966E Broadhoilow Rd.
B. Farmingdale, N.Y. 11735

Att'n: M.A. Cransman

Re: Drum Storage of Toxic or Hazardous Materials

Gentlemen:

A recent inspection of your facility by a representative of this Department revealed that your facility is in violation of Article 12 of the Suffolk County Sanitary Code.

Article 12 regulates the storage and handling of both raw and waste tbxic or hazardous materials. Section 1203 defines a toxic or hazardous material as any substance, solution or mixture which may present a potential hazard to human health or drinking water. All existing or new facilities that store drums of toxic or hazardous materials (raw or waste) must obtain a permit to operate issued by the Department.

Prior to issuance of the permit, all storage areas for drums or other portable containers must meet construction standards acceptable to the Department. Containers must be stored on a concrete surface surrounded by a berm or curb to contain any spillage or leakage. Further details can be found in the enclosed Standards for Construction of Storage Areas for Portable Containers. Please complete and return 4 copies of the enclosed application for a permit to construct with plans for upgrading your facility within 60 days from the date of this letter.

Your plans will be reviewed for conformance with the enclosed standards. Facilities with approvable plans will be issued a permit to construct by the Department which will be valid for one year. Please note that a \$100 review fee is required for facilities having storage for a total of 25 or more 55 gallon drums or equivalent.

Very truly yours,

Peter R. Akras

Ass't. Public Health Engineer - Hazardous Materials Management

PRA/rt Encl.

65 JETSON LANE, P.O. 80X G CENTRAL ISLIP N.Y. 11722 (516) 254-2622



PETER F. COHALAN SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

Sept. 7, 1982

CERTIFIED MAIL - R.R.R.

Target Rock Corp. 1966 E. Broadhoilow Rd. Farmingdale, N.Y. 11735

Att'n: Mr. Fitzpatrick

Re: Storage of Toxic or Hazardous Materials

Gentlemen:

Our records indicate that your firm has failed to respond to our notice of May 27, 1982 regarding violations of Article 12 of the Suffolk County Sanitary Code.

Article 12 regulates the storage and handling of both raw and waste toxic or hazardous materials. Please be advised that failure to submit the required application and plans to upgrade your facility within 14 days from the date of this letter will be grounds for legal action. Article 2, Section 218(2) of the Sanitary Code provides for penalties of up to \$500 per day for each violation.

It is the policy of this Department to assist all firms in meeting the requirements of the law. If you need assistance in completing your application, you should contact this office immediately.

Very truly yours.

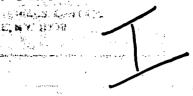
Peter R. Akras

Aas't. Public Health Engineer Hazardous Materials Management

plans rec'd 9/17/82

PRA/rt





PETER F. COHALAN
SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

DAVID HARRIS, M.D., M.P.H. COMMISSIONER

September 18, 1985

CERTIFIED MAIL R.R.R.

Target Rock Corporation 1966 "D" Broadhollow Road Farmingdale, New York 11735

Gentlemen:

Re: Inspection of September 17, 1985

On the above-referenced date a representative of our department Inspected your facility in order to determine the status of your compliance with the New York State Environmental Conservation Law and the Suffolk County Sanitary Code.

This inspection revealed that you have floor drains located in the vicinity of acid and caustic storage tanks which may be avenues for groundwater contamination. Our department directs that these floor drains be permanently sealed with concrete to eliminate this possibility. A reinspection will be made within 30 days to determine your compliance with this request.

If you have any questions regarding this correspondence, please do not hesitate to contact me at 451-4630.

Very truly yours,

John A. Gladysz

Inspectional Services

Environmental Pollution Control

JAG/jhn

PETER F. COHALAN
County Executive

COUNTY
Conunissioner

COUHTY OF SUFFOLK DEPARTMENT OF HEALTH SERVICES

In the Matter of the Alleged Violation of Article 12 of the Suffolk County Sanitary Code by

Target Rock Corp.

1966 East Broadhoilow Road
East Farmingdale, NY 11735

Respondent.

SUFFOLK COUNTY
OEPARTMENT OF HEALTH SERVICES

ORDER ON CONSENT NO, IW 83-86

DATE: December 2, 1983

GENERAL PROVISIONS

This Department alleges that the above-named Respondent has failed to comply with the provisions of the Suffolk County Sanitary Code as specified below. Because of such alleged non-compliance, the above-named Respondent consents and agrees to the issuance of this Order on Consent, and agrees to be bound by the terms, conditions and provisions stated herein.

Respondent understands that by entering into the Order on Consent with the Department, he is affirmatively and voluntarily waiving his right to a formal adjudicatory proceeding with respect to the matters herein addressed. Although the Department will not pursue further enforcement action with respect to the specific alleged violations of law set forth below if the above-named Respondent enters into this Order and abides by its terms, Respondent understands that the Department is not agreeing to forbearance from pursuing enforcement action regarding alleged violations not addressed by this Order. Moreover, Respondent understands that notwithstanding his execution of this Order on Consent, his failure to strictly comply with all of the terms, conditions and provisions herein contained will revive the Department's rights regarding the violations alleged as set forth below subject to a set-off for any penalties already paid pursuant to this Order on Consent. Furthermore, the Respondent is hereby advised that this Order on Consent, duly executed by the Respondent's agent and the Commissioner or his duly authorized representative has the force and effect of a Commissioner's Order, the violation of which is subject to penalties as provided in Section 218 of Article 2 of the Suffolk County Sanitary Code.

A modification of any of the provisions of this Order on Consent may be obtained by a timely written request demonstrating good and sufficient cause for the chance or extension requested. No modification of this Order shall be effective unless and until it is specifically set forth in writing by the Department.

SPECIFICATION OF ALLEGED VIOLATIONS

It is alleged that the Respondent above-named failed to comply with the following provisions of the Suffolk County Sanitary Code as indicated below:

On July 27, 1983 you did discharge toxic or hazardous materials without a New York State Pollutant Discharge Elimination System (SPDES) Permit in violation of Article 12, Section 1205.

SPECIFIC TERMS AND CONDITIONS

In satisfaction of the above-named Respondent's alleged violations of the Suffolk County Sanitary Code, the Respondent agrees to the entering and issuance of this Order of the Commissioner of the Suffolk County Department of Health Services, and the Respondent agrees to be bound by the terms and conditions following as well as by the above General Provisions.

- 1. By January 15 1984 the Respondent shall have submitted to the Suffolk County Department of Health Services its plans and applications for a "permit" to construct and to operate a storage facility for toxic or hazardous materials pursuant to the provisions of Article 12, Sections 1206 and 1207 of the Suffolk County Sanitary Code. The aforementioned permit is required for the Respondent's industrial waste receiving tank for Respondent's liquid penetrant "dye check" inspection process.
- 2. Permit applications and answers to questions concerning Article 12 storage facility requirements may be obtained by contacting Mr. Peter Akras, P.E. of this office at phone number (516) 451-4649.
- 3. Within ninety (90) days after department written approval of the Respondent's plans and permit applications, aforementioned, the Respondent shall have initiated land completed construction of its tank storage facility in accordance with its application and plans as approved by the department.
- 4. The Respondent realizes that its submitted plans and applications may be subject to reasonable requests for modifications, by the department, so that the plans and applications are in conformance with the requirements of Article 12.
- 5. That in satisfaction of the alleged violations herein, in addition to the above terms, provisions and conditions, Respondent

SPECIFIC TERMS AND CONDITIONS (continued)

agrees to pay a civil penalty of Five Hundred (\$500) Dollars. The civil penalty shall be paid to the Department of Health Services and shall be remitted with the return of this Order on Consent duly executed (sighed and notarized) by the Respondent.

6. There is no admission of guilt by the Respondent regarding

any of the allegations bf violations contained in this Order on Consent and the department so acknowledges same.

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CONSENT BY RESPONDENT

The Respondent herein named acknowledges the authority and jurisdiction of the Commissioner of the Suffolk County Department of Health Services to issue the foregoing Order on Consent, and Respondent voluntarily waives public hearing in this matter and agrees to be bound by the terms, conditions and provisions of this Order of the Commissioner.

Dated December 8, 1983	Respondent Target Rock Corp.
	By: (signature) from Classer
	(printed) Morris A. Crausman
	Title President
STATE OF NEW YORK)	
COUNTY OF SUFFOLK)	•
On the 8th day of Dependent of	usman to me known, who said that he resides at
that he is the President	of Respondent cordinates name as authorized by said
	Alma M Steertehen

CONSENT BY COMMISSIONER

The Commissioner of the Suffolk County Department of Health Services agrees to waive further administrative enforcement action against the Respondent named herein, and the Commissioner agrees to accept the Respondent's consent to the entry and issuance of this Order in full satisfaction of the Department's allegations herein listed, PROVIDED THAT the Respondent duly executes this Order and strictly adheres to all of its terms, conditions and provisions.

Dated: 18/25/83B

Hauppauge, New York

David Harris, M.D., M.P.H.. Commissioner

Suffolk County Department of Health Services



DEPARTMENT OF HEALTH SERVICES DAVID HARRIS, M.D., M.P.H. Commissioner

November 9, 1983

CERTIFIED MAIL - R.R.R.

Target Rock Corp. 1966 East Broadhoilow Road East Farmingdale, NY 11735

Gentlemen:

The records of this office indicate that you have violated Article of the Suffolk County Sanitary Code in that:

- 1. On July 27, 1983 you did discharge toxic or hazardous materials without a New York State Pollutant Discharge Elimination System (SPDES) Permit in violation of Article 12, Section 1205; and
- 2. On or about September 29, 1983 you did install a 2,000 gallon below ground storage tank without a permit pursuant to Article 12, Section 1207.

In order to resolve the foregoing violations, a preliminary hearing is being scheduled at this office on November 21, 1983at 2 p.m. You may appear at this hearing with or without counsel; you may produce witnesses and evidence, but no sworn testimony will be taken or recorded.

Please be advised that each violation of the Suffolk County Sanitary Code is punishable by a civil penalty not to exceed \$500 for each day or part thereof that such violation continues. Therefore, it would be in your best interest to appear at the preliminary hearing. A failure to appear will result in the scheduling of a formal hearing by the department.

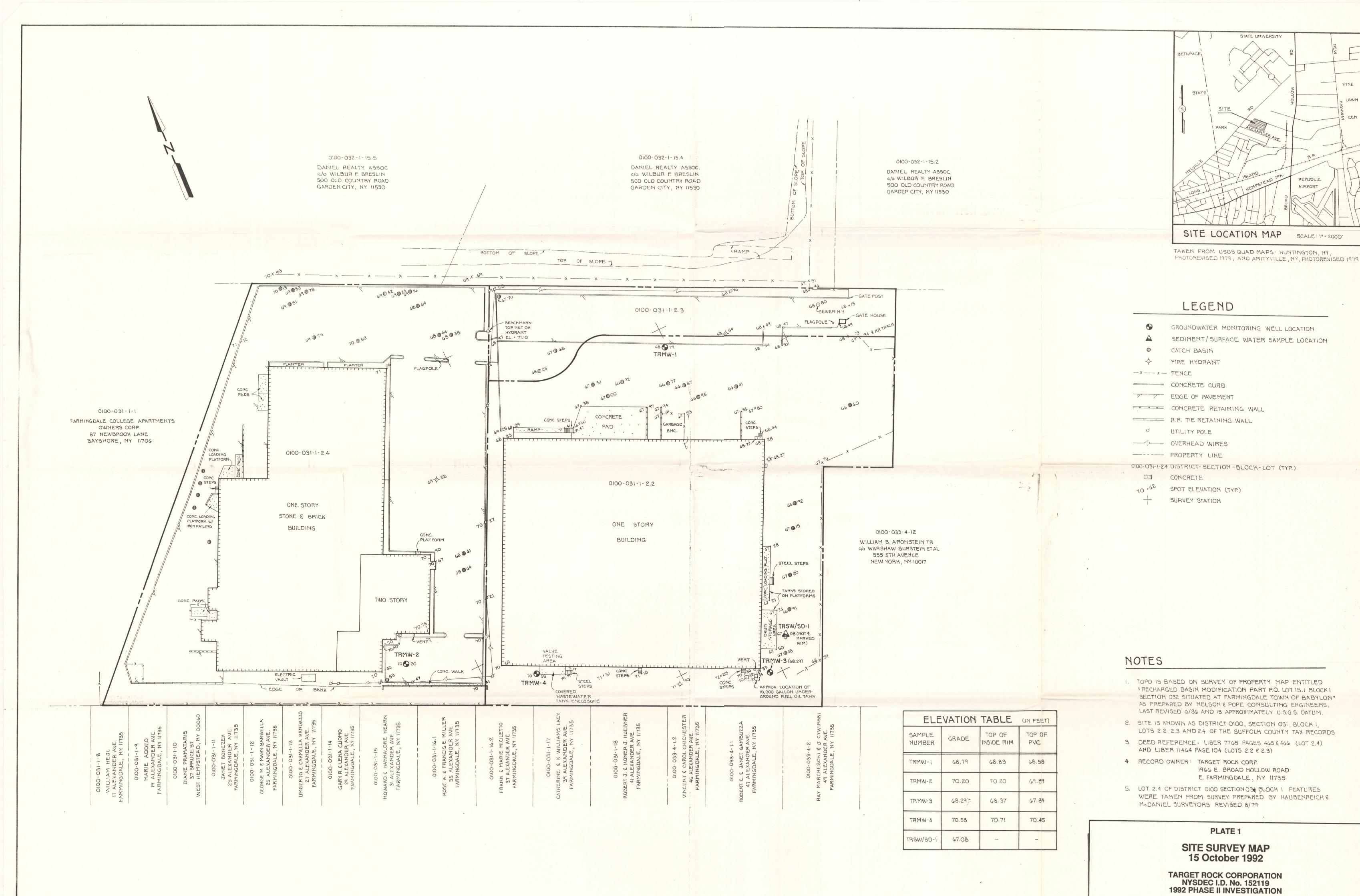
If you are unable to meet the above-mentloned scheduling requirements. or if you have any questions regarding this proceeding, please do not hesitate to contact this office.

Very truly yours,

Patrick Perrella Environmental Enforcement Services PP:daf

CC: J. Finkenberg

P. Akras, P.E.



LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York